

THE NETWORK SERVICES MARKET

EUROPE 1992 - 1997

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**Network Management Services Programme—
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***The Network Services Market, Europe,
1992-1997***

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Abstract

This report analyses the network services market in Europe, providing market size and forecast data and rankings of leading competitors. Individual assessments for each country market are given, including for the first time in 1992, those for Eastern Europe as a whole.

The network services sector is defined by INPUT as comprising two major segments:

Electronic information services (EI), which involves selling information to the user. Most typically these services are provided in the form of access to an on-line database or news service, but also include off-line access using a CD ROM-based service.

Network applications, which involves providing some form of enhanced transport service in support of a user's information processing needs. These include value-added network services (VAN services), electronic data interchange (EDI) and electronic information interchange (EII).



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I Introduction

A Objectives

Network services represents one of the fastest growing opportunity areas in the whole area of information services. Although still relatively small compared to the total IS market in Europe, \$5 billion in 1992 out of a total information services market of \$110 billion, it is anticipated to grow at 17% per annum over the next five years, compared to the 9% per annum growth rate of the whole industry.

The objective of this study is to provide an analysis of this market opportunity, both for Europe as a whole and for the individual country markets within it.

Specifically, the study sets out to provide current market size estimates, five-year forecasts and estimated revenue and market positioning of the leading vendors in the network services market.

B Scope

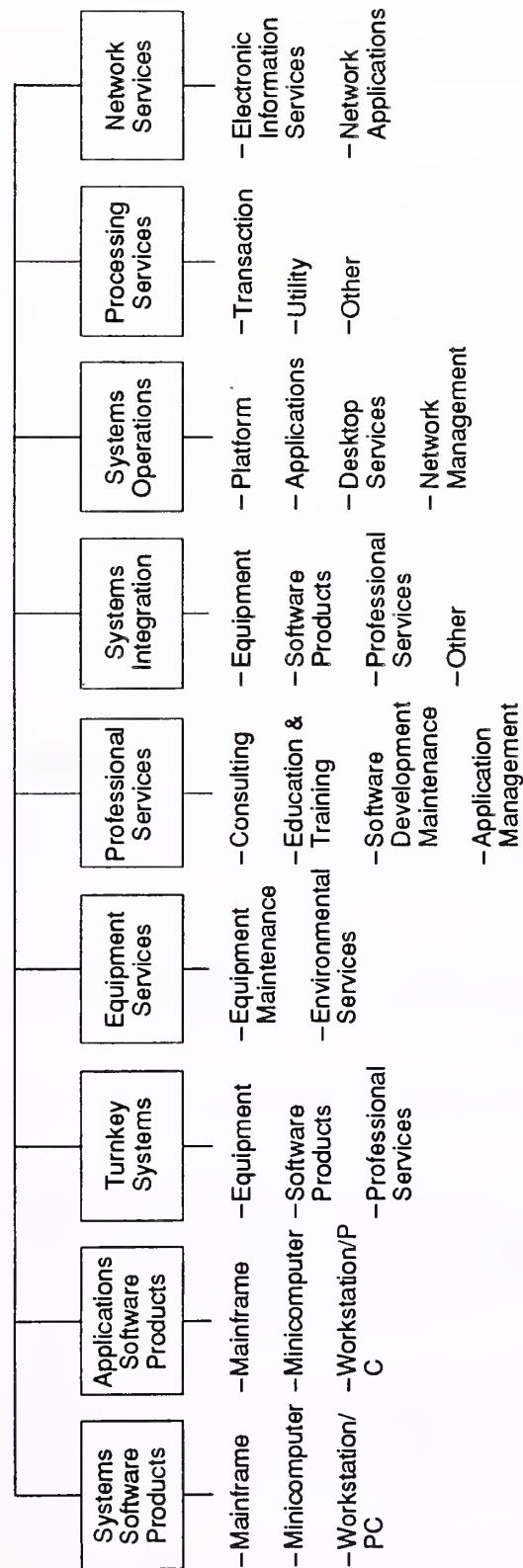
Network services typically includes a wide variety of network-based functions and operations. The key distinguishing feature is the involvement of the network.

Exhibit I-1 positions the network services sector within the overall information services market, which is further described in Appendix E. Network services is divided into two major segments: electronic information services (EIS), which involves selling information to the user, and network applications, which involves providing a whole range of enhanced transport services in support of a user's information processing needs.

This study provides market size and forecast data for these two sectors. The market analysis provided in the study covers the whole of Europe and provides individual country market forecasts for 16 countries and Eastern Europe. A precise definition of the countries that INPUT includes in the Eastern Europe category is given in Chapter IV. The U.S. dollar and ECU exchange rates used for the forecasts are listed in Appendix F.

EXHIBIT I-1

Information Services Industry Structure



Source: INPUT

C**Methodology**

The research that contributed to this study was derived from a number of sources:

- A series of interviews specifically targeted at network services vendors active in the European market
- A series of in-depth interviews with telecommunications and IS managers in major international companies
- INPUT's continuous analysis of the computer software and services market, which includes an annual programme of interviews with vendors and users in Europe

Additionally, INPUT's extensive library and database of information relating to the software and services industry was utilised.

D**Report Structure**

The remaining chapters of this study are structured in the following way:

- Chapter II is an executive overview providing a concise summary of the salient points of the report.
- Chapter III provides an overview of the European network services market, including the overall European forecast and the competitive analysis.
- Chapter IV contains the forecasts for each individual country market.
- The appendixes to the study contain a detailed database of each country market forecast in local currency, U.S. dollars and ECUs, and a reconciliation of the differences between this forecast and previous INPUT forecasts for the network services market.

II Executive Overview

A

Network Services - Market Growth as Users Gain Confidence

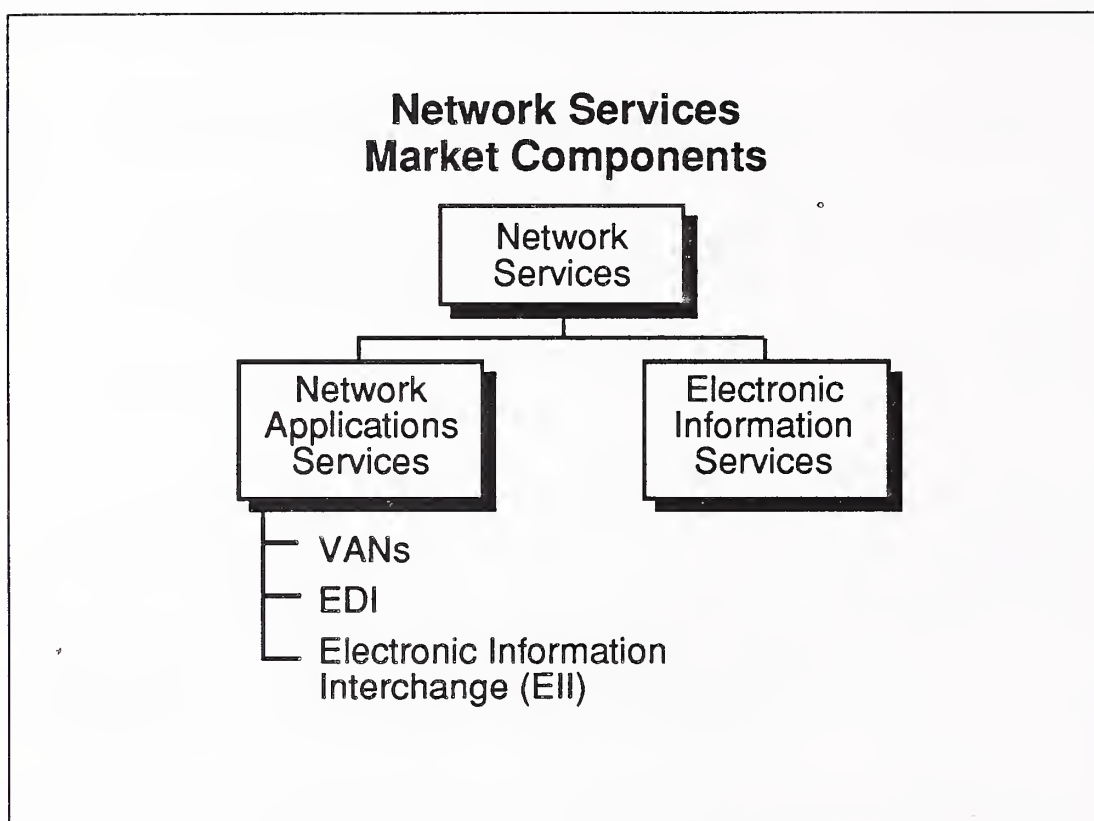
The use of network services is both a natural progression from private networking and an increasingly available and attractive option for organisations with new data networking requirements.

The corporate data network is no longer the sole realm of technical experts. Particularly in a recessionary environment, it is becoming viewed both as a financial burden and a valued business asset. Increasingly, organisations are taking stock of their corporate networking costs and investigating alternative means of satisfying their networking needs.

As a result of these changing user attitudes towards the network and emerging new business practices - for example, EDI - the network services sector overall will continue to grow in value well into the decade, at an average rate per year of 17%. Despite strong recessionary pressures over the past year - in particular in the U.K., which constitutes a large proportion of the overall market - the market overall has sustained growth over and above many sectors in the software and services industry. Market size is expected to reach a value of over \$10.5 billion by 1997.

INPUT defines the network services market into a number of component sectors. The formal definition of network services shows a market that is comprised of two principal subsectors: network applications and electronic information services. Exhibit II-1 shows the components of these subsectors.

EXHIBIT II-1

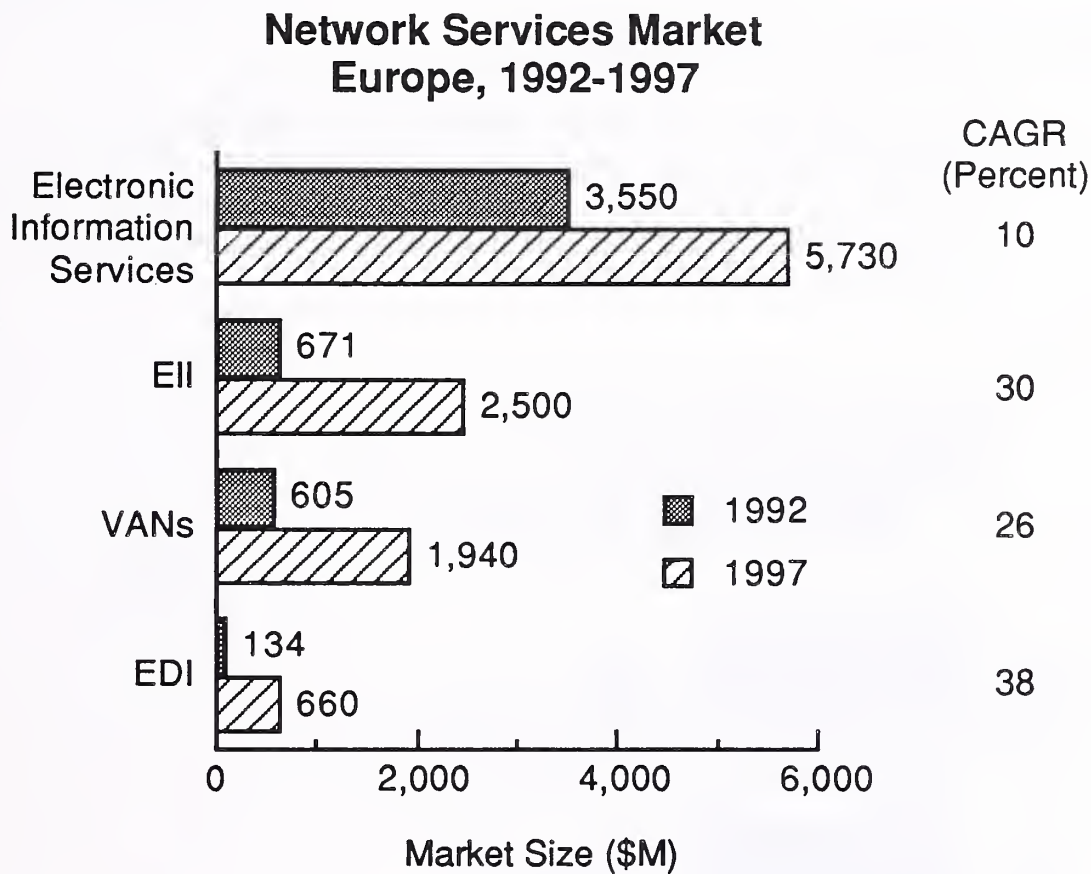


B

Growth Patterns Reflect Market Size

The market subsectors as defined by INPUT above are currently at various degrees of development in Europe. As a result, they will encounter varying rates of growth, as illustrated in Exhibit II-2.

EXHIBIT II-2



The EI market is currently the largest sector of the network services market and will continue to grow in size over the forecast period. The greater maturity of this market, however, in comparison to network applications will create slower growth, with the network applications market reaching a comparable value by the end of the forecast period.

In contrast, the smallest market currently - i.e., that for EDI - is proving the greatest area of activity, and will show the strongest growth, at a rate of 38% on average per annum, for the next five years.

The U.K. is currently by far the most developed economy in Europe in terms of EDI usage, and the remainder of Europe is swiftly installing EDI. The major users of the technology - i.e., the 'hub' accounts - combined

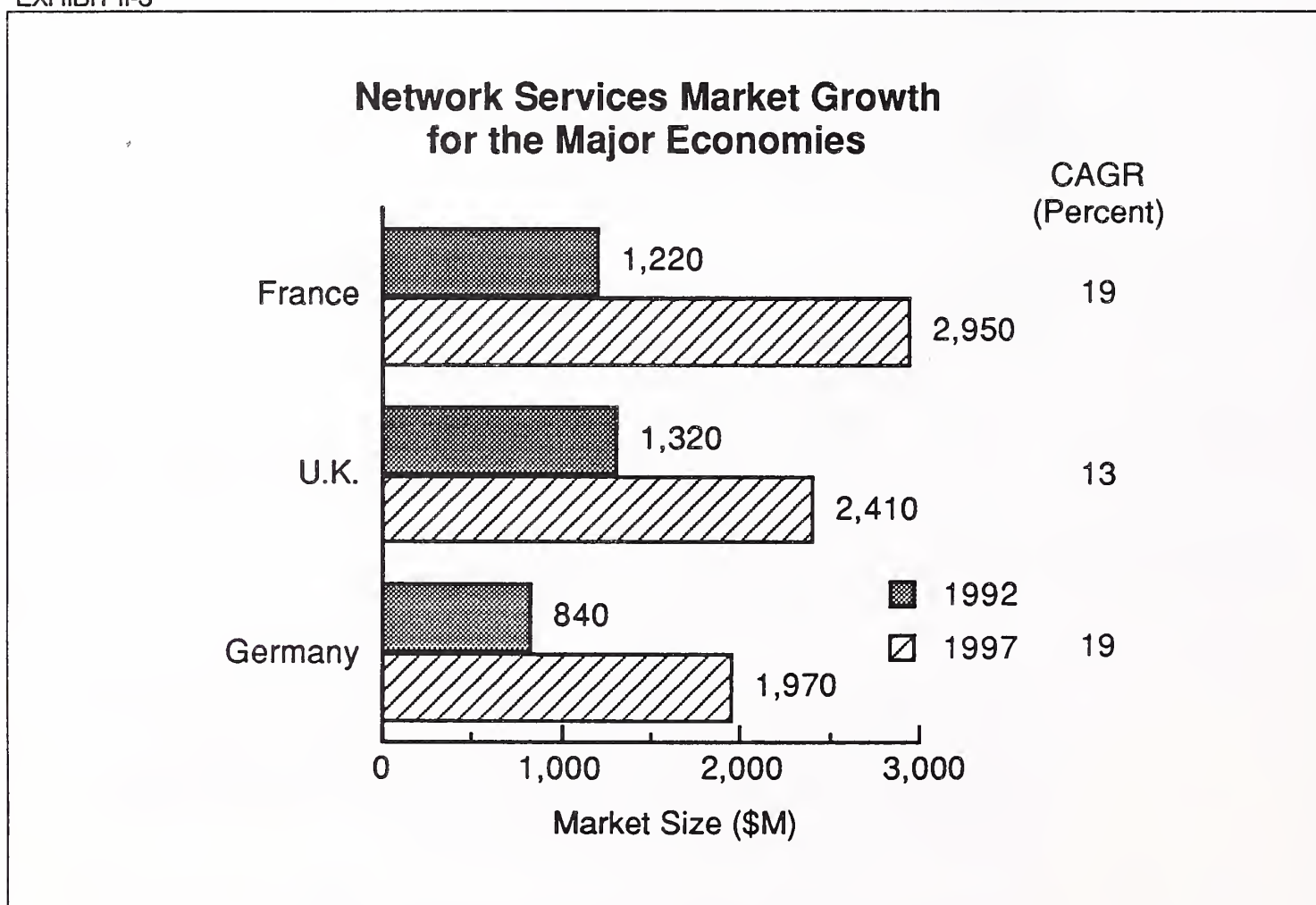
with the will of trading partners to promote the technology within industry sectors, will have a ripple effect on the market's development.

C

Highest Growth in Germany and France

Currently the U.K. and France are the largest markets in Europe for network services. This is strongly weighted by the use of EI services by the financial sectors in these markets, and in particular the U.K. Exhibit II-3 illustrates the comparative size and growth of the network services markets in the major economies.

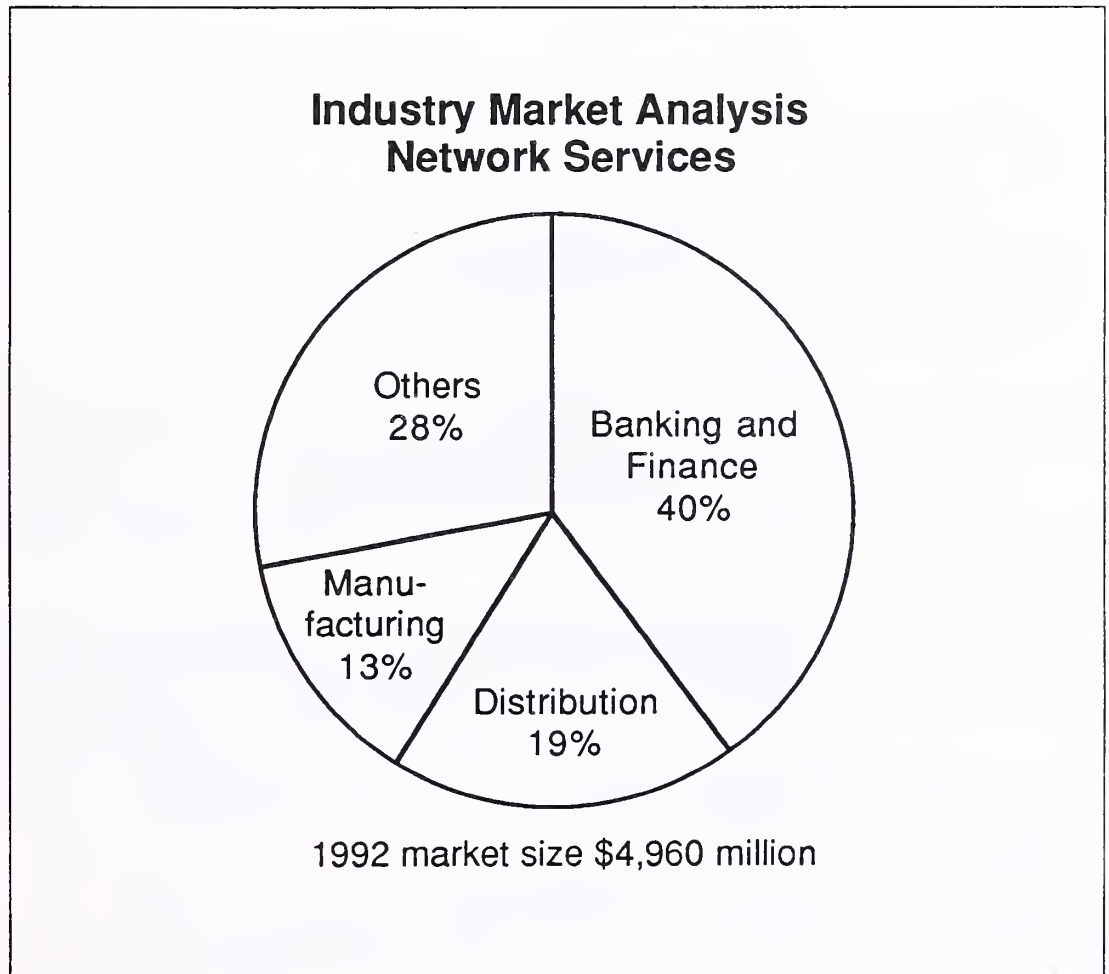
EXHIBIT II-3



The major constraints on the network services market are imposed by the PTTs and regulatory bodies. The current moves to liberalisation and greater freedom in Germany, combined with the country's economic size, will free the network applications market to grow substantially over the next five years, at a greater rate than France and the U.K. The total French market will overtake the U.K. to have the highest value in Europe in 1997.

D**Vertical Network Services Market Growth Greatest for Government and Distribution Sectors**

Exhibit II-4 provides an analysis of the expenditure on network services by industry sector. The largest market is the banking and finance sector; this is predominantly as a result of the high level of use of EI services in this industry sector.

EXHIBIT II-4

Network applications services are currently most strongly used by the distribution and manufacturing sectors. Manufacturing, in particular the discrete manufacturing sector, was the first industry to strongly support the uptake of EDI services in Europe. This trend is being closely followed by developments in the distribution sector.

Banking and finance will remain the greatest market in terms of user expenditure, closely followed by the distribution sector, which will experience substantial growth over the next five years.

Another high growth market will be the government sector, where the use of outsourcing as policy is more readily accepted and electronic processing is being increasingly investigated to rationalise administrative functions.

Additionally, the insurance sector will experience substantial growth as a result of specialist industry networks, which are continuing to be developed, within sectors in the insurance market.

E

PTTs Continue as the Dominant Vendors on a Country Level

Within the two subsectors of the network services sector - i.e., electronic information and network applications services - the leading vendors are from very different backgrounds.

The leading network applications vendors, in order of market position, are IBM, GEIS and BT, while the dominant electronic information services vendors, in order of rank, include Reuters, Telerate and Dun & Bradstreet.

As this shows, the network applications market on a European-wide level has been dominated by a supplier from the computing market, a specialist independent network provider and a telecommunications organisation. In the less fluid EI market, the dominant vendors are more specialised in the field - in particular, Reuters - and have maintained stable competitive positions.

The presence of IBM, GEIS and BT illustrates the diversity of the suppliers that are active in the network applications market. At the individual country level, however, the picture is different. Here individual PTTs such as BT, DBP Telekom and France Telecom, by virtue of history and monopolistic positions, continue to hold the strongest positions in their indigenous markets.

III

Market Analysis and Forecast

A

Vendors and Users Drive Market Against Continuing PTT Monopolies

The network services market is at the centre of an enormous amount of speculation and activity in the telecommunications arena in the 1990s. The gradual relaxation of PTT monopolies has allowed the market to develop within limited boundaries, but its full potential is far from realisation.

The market will continue to be adversely affected by the highly political and monopolistic positioning of the PTTs for a long time to come. Even following deregulatory measures, this influence is and will continue to prove hard to counter.

Despite these barriers, however, the network services market sector will continue to show considerably higher growth than many sectors of the software and services industry. The market is currently being driven by both users and vendors.

A highly competitive economic environment is pushing user organisations to re-evaluate their business costs and current use of their network assets. Along with other costly noncore activities, such as building maintenance and car fleet management, an organisation's network is increasingly being viewed as potential for outsourcing.

Additionally, technological capability over the network is becoming an increasingly important strategic and competitive tool for companies to remain in line with their competition.

Vendors from formerly divergent areas of the IT and telecommunications market are keen to enter the network services market. This interest is a move both to protect their installed base of customers and to generate alternative revenue streams.

The maturity of the major hardware markets and a number of the traditional software and services markets in Europe is serving to drive interest in network services. A large number of vendors will continue to invest a high level of resources into the development of the network services market and pursue strategies to ensure, and be a part of, its subsequent growth.

B

Market Definition

A detailed definition of the network services market as defined by INPUT is given in Appendix E.

1. Forecast Assumptions

The market assessments and forecasts provided in this report cover the period 1992 through to 1997 and assess user expenditure for network services contracts. Market sizes and forecasts are assessed in local currency and converted into U.S. dollars for aggregation and comparative purposes. The exchange rates used for this purpose are listed in Appendix F. Conversion of the country market forecasts from local currency into ECUs and U.S. dollars is provided in Appendixes B and C. The ECU and U.S. dollar conversion rates are listed in Appendix F.

Forecasts have been expressed in actual monetary terms and therefore include estimates for inflation. The inflation rates that have been used for each European country forecast are also listed in Appendix F.

2. Market Size and Growth

A summary of the forecasts for the network services sector is shown in Exhibit III-1. The far greater current size of the electronic information services market in comparison to network applications will have evened out by the end of the forecast period, following far greater growth for network applications.

EXHIBIT III-1

Network Services Market Forecast Europe, 1992-1997

Subsector	Market Size (\$ Millions)			
	1991	1992	1992-1997 CAGR (Percent)	1997
Network Applications	1,110	1,410	29	5,100
Electronic Information Services	3,300	3,550	10	5,730
Total (Rounded)	4,400	4,950	17	10,850

The network services sector is more usefully analysed when broken into its component services.

Exhibit III-2 shows the market forecast for the network applications submodes in Europe.

EXHIBIT III-2

Network Applications Services Market Forecast Europe, 1992-1997

Sector	Market Size (\$ Millions)		
	1992	1992-1997 CAGR (Percent)	1997
VANS	605	26	1,940
EDI	134	38	660
Electronic Mail	671	30	2,500
Total	1,410	29	5,100

These forecasts illustrate the range, in terms of size and growth, of the different areas of activity in the market-place. The EDI market, although the smallest market currently in terms of value, will show the strongest growth rate at 38% on average over the next five years.

The high growth of this market mirrors the increasing pressure from major 'hub' EDI users on their suppliers to implement the technology. Additionally, new users from different vertical markets, which are currently

investigating the technology's benefits and the increasing spread of EDI activity down the supply chain, will sustain the market's growth.

The current greater activity in the electronic messaging services and VAN services areas reflects the current greater scope of use of these services. These markets are more open in the sense that efficient use of these services does not rely, as it largely does with EDI, on the co-operative use of the technology with business and trading partners. These markets will continue to grow at a comparative rate to that of EDI, to serve increasingly information-intensive business environments and the greater level of outsourcing.

C

Comparative Country Markets

Exhibit III-3 shows the country market analysis of the total European network services market in U.S. dollars. The largest markets currently are the four largest economies in Europe: U.K., France, Germany and Italy.

EXHIBIT III-3

Network Services Comparative Country Market Forecasts Europe, 1992-1997

Country	Market Size (\$ Millions)			
	1991	1992	1997	1992-1997 CAGR (Percent)
United Kingdom	1,200	1,320	2,410	13
France	1,060	1,220	2,950	19
Germany	750	840	1,970	19
Italy	410	470	1,030	17
Netherlands	187	214	559	21
Spain	144	161	325	15
Switzerland	137	156	367	19
Belgium	119	133	229	11
Sweden	117	135	305	18
Denmark	88	102	229	18
Austria	58	63	105	11
Finland	51	56	87	9
Norway	56	63	123	14
Ireland	16	19	46	19
Greece	13	16	41	21
Portugal	6	8	33	33
Eastern Europe	2	2	17	53
Total (Rounded)	4,400	4,950	10,850	17

Cross-border communications are the most deregulated areas of the European market for network traffic. Currently, however, the vast majority of network service revenues are for intercountry traffic. Because of this, while countries in Europe face changes in terms of deregulation, the size and growth of markets will continue to be strongly influenced by the PTT monopolies.

As a result, the U.K. network services market is currently at a much more advanced state of development following the greater level of liberalisation in the market. This is combined with the very large proportion of EI use in the U.K. financial markets. The U.K. will maintain its position as the largest market in Europe throughout the forecast period. The Netherlands will follow a similar trend to the U.K. through its comparatively liberalised state. Alongside Belgium, international traffic handling levels in the Netherlands are at a higher level than many European countries, which will positively influence the size of the markets.

France, which as a country is very open to a 'service' environment following the success of the services offered by France Telecom, is closest to the U.K. in terms of size. The market for alternative providers to offer value-added network services in France has been open to competition since 1987, with restrictions on simple resale of capacity. Additionally, the investment in the telecommunications infrastructure and progressive technological developments in the country have opened up France as a strong prospective market.

Germany, with a far less liberalised environment, will be the most important country, in terms of growth and size combined, over the next five years. The potential size of the German market, along with the increasing moves towards liberalisation in the country, will ensure this. It has been possible for alternative network service providers to offer services in Germany following reforms in 1989. Service providers are also able to offer services without the prior requirement to obtain licences, which is often the case in other European countries.

The Italian market has been hampered by a confusing regulatory environment, which has restricted service providers by disallowing access to value-added services through private networks. The PTT has retained control by only allowing access through its public network. The route used into the market by non-national companies has been to enter into joint ventures with indigenous organisations in order to satisfy regulations.

D.**Competitive Analysis**

The network services sector, as defined by INPUT, is highly segmented in terms of competitors. Those active in the EI services market are rarely active in the network applications market and vice versa.

The leading European network applications services vendors are listed in Exhibit III-4, and the leading European EI services vendors are listed in Exhibit III-5. For more detailed analysis of the network applications service vendors, see INPUT's companion study, *Network Services Competitive Analysis, 1992*.

The greater maturity of the EI market and dominance of vendors such as Reuters, Telerate and Dun & Bradstreet have led to a far more stable competitive environment with little change in terms of competitive positioning.

The network applications services market, which is, however, in a far less developed state of maturity, is far more buoyant in terms of competition. The market is currently divided between vendors from several areas of the computing and telecommunications markets. The vendors involved include:

- Specialist independent network vendors
- Processing services vendors
- Telecommunications companies
- Computer and network equipment suppliers

IBM and GEIS currently dominate the European market overall, with a significant presence in most countries in Europe. The PTT dominance, however, within particular countries still holds strong for national network service revenues.

Exhibits III-4 to III-13 give INPUT's estimated market share and positioning of the vendors active in the network services market in Europe in 1991. Please note that the totals may not agree to the sum of the detail lines due to rounding.

EXHIBIT III-4

Leading Vendors - Network Applications Services Europe, 1991

Rank	Vendor	Country Origin	Estimated Sector of Revenues (\$ Millions)	Market Share (Percent)
1	IBM	U.S.	110	9.9
2	GEIS	U.S.	105	9.5
3	Infonet	Belgium	100	9.0
4 =	France Telecom	France	80	7.2
4 =	BT/Tymnet	U.K.	80	7.2
6	AT&T Istel	U.S.	60	5.4
7	GSI	France	50	4.5
8 =	Telesystemes	France	45	4.1
8 =	Sligos	France	45	4.1
10	Bull	France	40	3.6
	Total Listed		715	64.4
	Total Market		1,110	100.0

EXHIBIT III-5

Leading Vendors - Electronic Information Services Europe, 1991

Rank	Vendor	Country Origin	Estimated Sector of Revenues (\$ Millions)	Market Share (Percent)
1	Reuters	U.K.	1,160	35.2
2	Telerate	U.S.	245	7.4
3	Dun & Bradstreet	U.S.	170	5.2
4	Telekurs	Switzerland	120	3.6
5	Citicorp	U.S.	95	2.9
6	DAFSA	France	70	2.1
7	Extel	U.K.	65	2.0
8	Mead	U.S.	55	1.7
9	ADP Financial	U.S.	50	1.5
10	Telesystemes	France	40	1.2
	Total Listed		2,070	62.7
	Total Market		3,300	100.0

EXHIBIT III-6

Leading Vendors - Network Applications Services France, 1991

Rank	Vendor	Country Origin	Estimated Sector of Revenues (FF Millions)	Market Share (Percent)
1	France Telecom	France	320	17.8
2	Sligos	France	200	11.1
3	SG2	France	190	10.6
4 =	GSI	France	180	10.0
4 =	Infonet	Belgium	180	10.0
6	Telesystemes	France	130	7.2
7	Bull	France	100	5.6
8	GEIS	U.S.	90	5.0
9 =	Alcatel TiTN	France	80	4.4
9 =	Steria	France	80	4.4
	Total Listed		1,550	86.1
	Total Market		1,800	100.0

EXHIBIT III-7

Leading Vendors - Electronic Information Services France, 1991

Rank	Vendor	Country Origin	Estimated Sector of Revenues (FF Millions)	Market Share (Percent)
1	Reuters	U.K.	1,140	30.8
2	DAFSA	U.S.	390	10.5
3	Telerate	U.S.	240	6.5
4	Dun & Bradstreet	U.S.	205	5.5
5	Citicorp	U.S.	105	2.8
6	Mead	U.S.	60	1.6
7	Telekurs	Switzerland	55	1.5
8	Lotus	U.S.	5	0.1
9 =	Extel	U.K.	5	0.1
9 =	Quick	Japan	5	0.1
	Total Listed		2,210	59.7
	Total Market		3,700	100.0

EXHIBIT III-8

Leading Vendors - Network Applications Services Germany, 1991

Rank	Vendor	Country Origin	Estimated Sector of Revenues (DM Millions)	Market Share (Percent)
1	Telekom	Germany	60	36.4
2	IBM	U.S.	30	18.2
3	GEIS	U.S.	11	6.7
4	Infonet	Belgium	9	5.5
5 =	GSI	France	8	4.8
5 =	Ikoss (Sligos)	Germany	8	4.8
7 =	Bull	France	5	3.0
7 =	Alldata	Germany	5	3.0
7 =	TDS	Germany	5	3.0
10	DAT-Gruppe	Germany	3	1.8
	Total Listed		144	87.3
	Total Market		165	100.0

EXHIBIT III-9

Leading Vendors - Electronic Information Services Germany, 1991

Rank	Vendor	Country Origin	Estimated Sector of Revenues (DM Millions)	Market Share (Percent)
1	Reuters	U.K.	350	36.1
2	Telerate	U.S.	75	7.7
3 =	Bertelsmann	Germany	60	6.2
3 =	Genios	Germany	60	6.2
3 =	VWD	Germany	60	6.2
6	Dun & Bradstreet	U.S.	35	3.6
7	Telekurs	Switzerland.	30	3.1
8	Mead	U.S.	10	1.0
9 =	STN	Germany	5	0.5
9 =	Datastar	Germany	5	0.5
	Total Listed		690	71.1
	Total Market		970	100.0

EXHIBIT III-10

Leading Vendors - Network Applications Services United Kingdom, 1991

Rank	Vendor	Country Origin	Estimated Sector of Revenues (£ Millions)	Market Share (Percent)
1	BT	U.K.	30	20.7
2	AT&T Istel	U.S.	25	17.2
3	IBM	U.S.	19	13.1
4 =	ICL (Fujitsu)	U.K. (Japan)	12	8.3
4 =	GEIS	U.S.	12	8.3
6	Compuserve	U.K.	6	4.1
7 =	Sprint-Telenet	U.K.	5	3.4
7 =	EDS-Scicon	U.S.	5	3.4
9	Centre-file	U.K.	3	2.1
10	Bull	France	2	1.4
	Total Listed		119	82.1
	Total Market		145	100.0

EXHIBIT III-11

Leading Vendors - Electronic Information Services United Kingdom, 1991

Rank	Vendor	Country Origin	Estimated Sector of Revenues (£ Millions)	Market Share (Percent)
1	Reuters	U.K.	185	37.8
2	Telerate	U.S.	40	8.2
3 =	Extel	U.K.	30	6.1
3 =	Citicorp	U.S.	30	6.1
5 =	Dun & Bradstreet	U.S.	20	4.1
5 =	ADP	U.S.	20	4.1
7	Quick	U.K.	15	3.1
8 =	Mead	U.S.	10	2.0
8 =	Infolink	Belgium	10	2.0
10	Infocheck	U.K.	5	1.0
	Total Listed		365	74.5
	Total Market		490	100.0

EXHIBIT III-12

Leading Vendors - Network Applications Services Italy, 1991

Rank	Vendor	Country Origin	Estimated Sector of Revenues (Lira Billions)	Market Share (Percent)
1	GEIS	U.S.	15	12.5
2 =	Infonet	Belgium	10	8.3
2 =	Olivetti	Italy	10	8.3
2 =	IBM	U.S.	10	8.3
2 =	Finsiel	Italy	10	8.3
2 =	Bull	France	10	8.3
7	INTESA	Italy	8	6.7
8 =	Database Informatica	Italy	4	3.3
8 =	Lombardia Informatica	Italy	4	3.3
10	Datamont	Italy	3	2.5
	Total Listed		84	70.0
	Total Market		120	100.0

EXHIBIT III-13

Leading Vendors - Electronic Information Services Italy, 1991

Rank	Vendor	Country Origin	Estimated Sector of Revenues (Lira Billions)	Market Share (Percent)
1	Reuters	U.K.	120	34.3
2	Cerved	Italy	40	11.4
3 =	Telerate	U.S.	25	7.1
3 =	IRI	Italy	25	7.1
5 =	Citicorp	U.S.	15	4.3
5 =	Dun & Bradstreet	U.S.	15	4.3
7	INTESA	Italy	10	2.9
8 =	Lombardia Informatica	Italy	5	1.4
8 =	Datitalia Processing	Italy	5	1.4
8 =	Mead	U.S.	5	1.4
	Total Listed		265	75.7
	Total Market		350	100.0

E

Industry Market Analysis

As illustrated in Exhibit III-14, the banking and finance sector is by far the greatest user of network services at present. A large proportion of this expenditure, however, is accounted for by the widespread use of EI services provided by Reuters, Telerate and Dun & Bradstreet.

EXHIBIT III-14

Industry Sector Analysis Network Services Europe, 1992-1997

Industry Sector	Market Size (\$ Millions)		
	1992	1992-1997 CAGR (Percent)	1997
Manufacturing	620	18	1,400
Distribution	960	21	2,500
Utilities	115	21	300
Banking & Finance	1,970	15	3,890
Insurance	285	19	690
Government	280	26	900
All Other	720	10	1,170
Total	4,950	17	10,850

The financial institutions, which traditionally have spent highly on telecommunications and have been the main markets for private network equipment manufacturers, have not been attracted to network services as much as has been hoped by vendors. The financial institutions are proving very conservative in their use of third-party network services, and in the U.K. in particular are attempting to offer their own EDI services to generate revenue from their networks, rather than spend heavily on third-party services.

The government and distribution industry sectors will show the greatest growth in the use of network services over the next five years. Government bodies are increasingly outsourcing services of all types as a matter of policy, which is including the private data networking functions. Also, the high level of administration in these organisations is being increasingly recognised as lending itself to the use of EDI.

The distribution and manufacturing sectors use network services predominantly in the field of EDI. This usage is set to increase, particularly in the distribution sector, for higher levels of international traffic usage.

Network application services are currently most strongly used by the distribution and manufacturing sectors. Manufacturing, in particular the discrete manufacturing sector, was the first industry to strongly support the uptake of EDI services in Europe. This trend is being closely followed by developments in the distribution sector.

Banking and finance will remain the greatest markets in terms of user expenditure, closely followed by the distribution sector which will experience substantial growth over the next five years.

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IV

Country Market Size and Forecast

This chapter provides data on the network services market in the individual countries of Europe. Each country is identified separately, with Eastern European figures given for the region as a whole.

Exhibits IV-1 to IV-17 contain forecast data for each country in local currency, with Eastern European figures given in U.S. dollars. All these tables have been based on rounded figures at the individual cell and total levels. Totals therefore may not always tally to the sum of the individual cells shown.

For the purposes of INPUT's worldwide report and forecast, Eastern Europe is defined as Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Romania, the Baltic States (Estonia, Latvia and Lithuania), the independent states emerging from the break-up of Yugoslavia (Croatia, Slovenia and the remainder of Yugoslavia), and the independent republics of the new Commonwealth, which was established in January 1992 after the dissolution of the Soviet Union (Byelorussia, the Russian Federation, Ukraine and the other republics in Europe).

Strictly speaking, certain republics in what was 'Russia in Asia' - such as Kazakhstan, Armenia, and Azerbaijan - should be included under INPUT's Asian Region. (There are already signs that infrastructures in the old Soviet Far East will look to Japan and Hong Kong, for example, for new project implementations and for ongoing operational support).

However, these markets are small and are currently included under Eastern European forecasts.

East Germany is now part of the German market, in whose forecasts it is taken into account. It does, however, still have many of the characteristics of the Eastern European 'second-world' market.

An AT-compatible PC that cost over 35,000 roubles in Moscow in September 1991, cost 55,000 roubles by November as the auction exchange rate moved from \$1 for 30 roubles in June to 88 roubles in November. Because of this high rate of inflation, INPUT has not attempted to build any inflation factor into its five-year forecasts for the Eastern European region. Therefore, the forecasts are quoted in constant 1990 U.S. dollars.

Comparative country market sizes expressed in U.S. dollars are provided in Chapter III, section C. A complete database of country market forecasts expressed in U.S. dollars is given in Appendix C. A complete database of country market forecasts expressed in local currencies can be found in Appendix A. Appendix B contains the forecast database for each country expressed in ECUs.

EXHIBIT IV-1

Network Services Market Forecast, 1992-1997 France

Delivery Modes	FF Millions					
	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	5,500	15	6,300	7,400	15,300	19
- Electronic Information Services	3,700	7	3,950	4,300	6,000	9
- Network Applications	1,800	31	2,350	3,100	9,300	32

EXHIBIT IV-2

Network Services Market Forecast, 1992-1997 Germany

	DM Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	1,140	12	1,280	1,510	3,000	19
- Electronic Information Services	970	9	1,060	1,220	2,050	14
- Network Applications	165	33	220	290	950	34

EXHIBIT IV-3

Network Services Market Forecast, 1992-1997 United Kingdom

	£ Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	640	9	700	780	1,280	13
- Electronic Information Services	490	6	520	560	760	8
- Network Applications	145	21	175	220	515	24

EXHIBIT IV-4

Network Services Market Forecast, 1992-1997 Italy

	Lira Billions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	470	16	545	645	1,180	17
- Electronic Information Services	350	11	390	440	635	10
- Network Applications	120	29	155	205	545	29

EXHIBIT IV-5

Network Services Market Forecast, 1992-1997 Sweden

	SK Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	650	15	750	880	1,690	18
- Electronic Information Services	445	8	480	525	670	7
- Network Applications	200	33	265	350	1,015	31

EXHIBIT IV-6

Network Services Market Forecast, 1992-1997 Denmark

	DK Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	520	15	600	710	1,350	18
- Electronic Information Services	335	9	365	400	525	8
- Network Applications	180	31	235	305	820	28

EXHIBIT IV-7

Network Services Market Forecast, 1992-1997 Norway

	NK Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	335	12	375	420	735	14
- Electronic Information Services	240	8	260	280	410	10
- Network Applications	95	21	115	140	325	23

EXHIBIT IV-8

Network Services Market Forecast, 1992-1997 Finland

	FM Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	210	10	230	260	360	9
- Electronic Information Services	135	11	150	160	195	5
- Network Applications	70	14	80	95	160	15

EXHIBIT IV-9

Network Services Market Forecast, 1992-1997 Netherlands

	Dfl Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	320	14	365	430	955	21
- Electronic Information Services	220	7	235	255	375	10
- Network Applications	100	30	130	175	580	35

EXHIBIT IV-10

Network Services Market Forecast, 1992-1997 Belgium

	BF Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	3,700	12	4,150	4,650	7,150	11
- Electronic Information Services	2,450	8	2,650	2,860	3,730	7
- Network Applications	1,250	19	1,490	1,770	3,420	18

EXHIBIT IV-11

Network Services Market Forecast, 1992-1997 Switzerland

	SF Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	185	14	210	250	495	19
- Electronic Information Services	155	10	170	195	305	12
- Network Applications	30	33	40	55	190	37

EXHIBIT IV-12

Network Services Market Forecast, 1992-1997 Austria

	Sch Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	610	10	670	745	1,115	11
- Electronic Information Services	530	7	565	610	755	6
- Network Applications	80	31	105	135	360	28

EXHIBIT IV-13

Network Services Market Forecast, 1992-1997 Spain

	Ptas Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	13,800	12	15,500	17,900	31,200	15
- Electronic Information Services	10,500	10	11,500	12,900	19,700	11
- Network Applications	3,300	21	4,000	5,000	11,500	24

EXHIBIT IV-14

Network Services Market Forecast, 1992-1997 Portugal

	Esc Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	800	31	1,050	1,350	4,450	33
- Electronic Information Services	620	23	760	950	2,580	28
- Network Applications	200	40	280	400	1,850	46

EXHIBIT IV-15

Network Services Market Forecast, 1992-1997 Greece

	Dra Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	2,300	17	2,700	3,250	7,100	21
- Electronic Information Services	1,700	11	1,890	2,170	3,610	14
- Network Applications	620	31	810	1,100	3,510	34

EXHIBIT IV-16

Network Services Market Forecast, 1992-1997 Ireland

	IR £ Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	9	22	11	13	26	19
- Electronic Information Services	6	8	7	8	12	12
- Network Applications	3	33	4	5	15	29

EXHIBIT IV-17

Network Services Market Forecast, 1992-1997 Eastern Europe

	U.S. \$ Millions					
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1997	'92-'97 CAGR (%)
Network Services	2	0	2	4	17	53
- Electronic Information Services	1	0	1	1	4	48
- Network Applications	1	50	2	3	14	55

A

Forecast Database - Local Currency

Please note that totals may not agree to the sum of the detail lines due to rounding.

EXHIBIT A-1

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 France

	FF Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	5,500	15	6,300	7,400	8,800	10,600	12,700	15,300	19
- Electronic Information Services	3,700	7	3,950	4,300	4,700	5,150	5,550	6,000	9
- Network Applications	1,800	31	2,350	3,100	4,100	5,450	7,100	9,300	32

EXHIBIT A-2

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Germany

	DM Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	1,140	12	1,280	1,510	1,790	2,140	2,530	3,000	19
- Electronic Information Services	970	9	1,060	1,220	1,400	1,610	1,820	2,050	14
- Network Applications	165	33	220	290	390	530	710	950	34

EXHIBIT A-3

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 United Kingdom

	£ Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	640	9	700	780	890	1,000	1,130	1,280	13
- Electronic Information Services	490	6	520	560	610	660	710	760	8
- Network Applications	145	21	175	220	275	340	420	515	24

EXHIBIT A-4

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Italy

	Lira Billions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	470	16	545	645	750	875	1,010	1,180	17
- Electronic Information Services	350	11	390	440	485	535	580	635	10
- Network Applications	120	29	155	205	265	340	430	545	29

EXHIBIT A-5

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Sweden

	SK Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	650	15	750	880	1,040	1,220	1,430	1,690	18
- Electronic Information Services	445	8	480	525	570	610	640	670	7
- Network Applications	200	33	265	350	465	610	785	1,015	31

EXHIBIT A-6

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Denmark

	DK Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	520	15	600	710	840	990	1,160	1,350	18
- Electronic Information Services	335	9	365	400	440	475	500	525	8
- Network Applications	180	31	235	305	400	515	655	820	28

EXHIBIT A-7

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Norway

	NK Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	335	12	375	420	485	560	640	735	14
- Electronic Information Services	240	8	260	280	310	345	375	410	10
- Network Applications	95	21	115	140	175	215	265	325	23

EXHIBIT A-8

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Finland

	FM Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	210	10	230	260	280	310	330	360	9
- Electronic Information Services	135	11	150	160	170	180	185	195	5
- Network Applications	70	14	80	95	110	125	140	160	15

EXHIBIT A-9

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Netherlands

	Dfl Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	320	14	365	430	515	630	770	955	21
- Electronic Information Services	220	7	235	255	280	310	340	375	10
- Network Applications	100	30	130	175	235	320	430	580	35

EXHIBIT A-10

**Network Services Market Forecast in Local Currency
by Market Segment, 1992-1997
Belgium**

	BF Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	3,700	12	4,150	4,650	5,200	5,800	6,500	7,150	11
- Electronic Information Services	2,450	8	2,650	2,860	3,090	3,310	3,550	3,730	7
- Network Applications	1,250	19	1,490	1,770	2,110	2,490	2,950	3,420	18

EXHIBIT A-11

**Network Services Market Forecast in Local Currency
by Market Segment, 1992-1997
Switzerland**

	SF Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	185	14	210	250	295	355	415	495	19
- Electronic Information Services	155	10	170	195	220	250	275	305	12
- Network Applications	30	33	40	55	75	105	140	190	37

EXHIBIT A-12

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Austria

	Sch Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	610	10	670	745	830	920	1,030	1,115	11
- Electronic Information Services	530	7	565	610	655	695	740	755	6
- Network Applications	80	31	105	135	175	225	290	360	28

EXHIBIT A-13

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Spain

	Ptas Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	13,800	12	15,500	17,900	20,600	24,100	27,800	31,200	15
- Electronic Information Services	10,500	10	11,500	12,900	14,400	16,300	18,200	19,700	11
- Network Applications	3,300	21	4,000	5,000	6,200	7,800	9,600	11,500	24

EXHIBIT A-14

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Portugal

	Esc Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	800	31	1,050	1,350	1,800	2,450	3,300	4,450	33
- Electronic Information Services	620	23	760	950	1,200	1,570	2,040	2,580	28
- Network Applications	200	40	280	400	580	860	1,280	1,850	46

EXHIBIT A-15

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Greece

	Dra Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	2,300	17	2,700	3,250	4,000	4,900	6,050	7,100	21
- Electronic Information Services	1,700	11	1,890	2,170	2,500	2,880	3,310	3,610	14
- Network Applications	620	31	810	1,100	1,490	2,010	2,720	3,510	34

EXHIBIT A-16

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Ireland

	IR £ Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	9	22	11	13	15	18	22	26	19
- Electronic Information Services	6	8	7	8	9	10	11	12	12
- Network Applications	3	33	4	5	7	9	11	15	29

EXHIBIT A-17

Network Services Market Forecast in Local Currency by Market Segment, 1992-1997 Eastern Europe

	U.S. \$ Millions								
Delivery Modes	1991	'91-'92 AGR (%)	1992	1993	1994	1995	1996	1997	'92-'97 CAGR (%)
Network Services	2	0	2	4	6	8	12	17	53
- Electronic Information Services	1	0	1	1	2	2	3	4	48
- Network Applications	1	50	2	3	4	6	9	14	55

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B

Forecast Database - ECUs

Please note that totals may not agree to the sum of the detail lines due to rounding.

EXHIBIT B-1

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 France

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	790	15	910	1,060	1,260	1,520	1,820	2,200	19
- Electronic Information Services	530	7	570	620	680	740	800	860	9
- Network Applications	260	31	340	450	590	780	1,020	1,340	32

EXHIBIT B-2

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Germany

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	560	12	630	740	880	1,050	1,240	1,470	19
- Electronic Information Services	480	9	520	600	690	790	890	1,000	14
- Network Applications	80	33	110	140	190	260	350	470	34

EXHIBIT B-3

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 United Kingdom

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	900	9	980	1,090	1,240	1,400	1,580	1,790	13
- Electronic Information Services	690	6	730	780	850	920	990	1,060	8
- Network Applications	200	21	240	310	380	480	590	720	24

EXHIBIT B-4

**Network Services Market Forecast in ECUs
by Market Segment, 1992-1997
Italy**

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	300	16	350	420	490	570	650	760	17
- Electronic Information Services	230	11	250	280	310	350	380	410	10
- Network Applications	80	29	100	130	170	220	280	350	29

EXHIBIT B-5

**Network Services Market Forecast in ECUs
by Market Segment, 1992-1997
Sweden**

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	87	15	101	118	140	164	192	227	18
- Electronic Information Services	60	8	65	71	77	82	86	90	7
- Network Applications	27	33	36	47	63	82	106	136	31

EXHIBIT B-6

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Denmark

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	66	15	76	90	106	126	147	170	18
- Electronic Information Services	42	9	46	51	56	60	63	66	8
- Network Applications	23	31	30	39	51	65	83	104	28

EXHIBIT B-7

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Norway

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	42	12	47	53	61	70	80	92	14
- Electronic Information Services	30	8	33	35	39	43	47	51	10
- Network Applications	12	21	15	18	22	27	33	41	23

EXHIBIT B-8

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Finland

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	38	10	42	47	51	57	60	66	9
- Electronic Information Services	25	11	27	29	31	33	34	36	5
- Network Applications	13	14	15	17	20	23	26	29	15

EXHIBIT B-9

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Netherlands

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	140	14	160	188	225	275	336	417	21
- Electronic Information Services	96	7	103	112	123	136	149	164	10
- Network Applications	44	30	57	77	103	140	188	254	35

EXHIBIT B-10

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Belgium

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	88	12	99	111	124	139	155	171	11
- Electronic Information Services	59	8	63	68	74	79	85	89	7
- Network Applications	30	19	36	42	51	60	71	82	18

EXHIBIT B-11

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Switzerland

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	102	14	116	138	163	196	230	274	19
- Electronic Information Services	86	10	94	108	122	138	152	169	12
- Network Applications	17	33	22	31	42	58	78	105	37

EXHIBIT B-12

**Network Services Market Forecast in ECUs
by Market Segment, 1992-1997
Austria**

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	43	10	47	52	58	64	72	78	11
- Electronic Information Services	37	7	40	43	46	49	52	53	6
- Network Applications	6	31	8	10	12	16	20	25	28

EXHIBIT B-13

**Network Services Market Forecast in ECUs
by Market Segment, 1992-1997
Spain**

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	107	12	120	138	159	186	215	241	15
- Electronic Information Services	81	10	89	100	111	126	141	152	11
- Network Applications	26	21	31	39	48	60	74	89	24

EXHIBIT B-14

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Portugal

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	4	31	6	8	10	14	18	25	33
- Electronic Information Services	3	23	4	5	7	9	11	14	28
- Network Applications	1	40	2	2	3	5	7	10	46

EXHIBIT B-15

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Greece

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	10	17	12	14	17	21	26	30	21
- Electronic Information Services	7	11	8	9	11	12	14	15	14
- Network Applications	3	31	3	5	6	9	12	15	34

EXHIBIT B-16

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Ireland

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	12	22	14	17	20	24	29	34	19
- Electronic Information Services	8	8	9	10	11	12	14	15	12
- Network Applications	4	33	5	7	9	11	14	19	29

EXHIBIT B-17

Network Services Market Forecast in ECUs by Market Segment, 1992-1997 Eastern Europe

	ECU Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	2	0	2	3	5	6	9	13	53
- Electronic Information Services	0	0	0	1	1	2	2	3	48
- Network Applications	1	50	1	2	3	5	7	10	55

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C

Forecast Database - U.S. Dollars

Please note that totals may not agree to the sum of the detail lines due to rounding.

EXHIBIT C-1

Network Services Market Forecast in U.S. \$ by Market Segment, 1992-1997 France

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	1,060	15	1,220	1,430	1,700	2,050	2,450	2,950	19
- Electronic Information Services	710	7	760	830	910	990	1,070	1,160	9
- Network Applications	350	31	450	600	790	1,050	1,370	1,800	32

EXHIBIT C-2

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Germany**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	750	12	840	990	1,180	1,410	1,660	1,970	19
- Electronic Information Services	640	9	700	800	920	1,060	1,200	1,350	14
- Network Applications	110	33	140	190	260	350	470	630	34

EXHIBIT C-3

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
United Kingdom**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	1,200	9	1,320	1,470	1,670	1,880	2,120	2,410	13
- Electronic Information Services	920	6	980	1,050	1,150	1,240	1,330	1,430	8
- Network Applications	270	21	330	410	520	640	790	970	24

EXHIBIT C-4

Network Services Market Forecast in U.S. \$ by Market Segment, 1992-1997 Italy

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	410	16	470	560	650	760	880	1,030	17
- Electronic Information Services	300	11	340	380	420	470	500	550	10
- Network Applications	100	29	130	180	230	300	370	470	29

EXHIBIT C-5

Network Services Market Forecast in U.S. \$ by Market Segment, 1992-1997 Sweden

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	117	15	135	159	188	220	258	305	18
- Electronic Information Services	81	8	87	95	103	110	116	121	7
- Network Applications	36	33	48	63	84	110	142	183	31

EXHIBIT C-6

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Denmark**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	88	15	102	121	143	168	197	229	18
- Electronic Information Services	57	9	62	68	75	81	85	89	8
- Network Applications	31	31	40	52	68	88	111	139	28

EXHIBIT C-7

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Norway**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	56	12	63	70	81	94	107	123	14
- Electronic Information Services	40	8	44	47	52	58	63	69	10
- Network Applications	16	21	19	24	30	36	45	55	23

EXHIBIT C-8 .

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Finland**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	51	10	56	63	68	75	80	87	9
- Electronic Information Services	33	11	36	39	41	44	45	47	5
- Network Applications	17	14	20	23	27	30	34	39	15

EXHIBIT C-9

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Netherlands**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	187	14	214	252	301	369	451	559	21
- Electronic Information Services	129	7	138	149	164	182	199	220	10
- Network Applications	59	30	75	103	138	187	252	339	35

EXHIBIT C-10

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Belgium**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	119	12	133	149	167	186	208	229	11
- Electronic Information Services	79	8	85	92	99	106	114	120	7
- Network Applications	40	19	48	57	68	80	95	110	18

EXHIBIT C-11

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Switzerland**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	137	14	156	185	219	263	308	367	19
- Electronic Information Services	115	10	126	145	163	185	204	226	12
- Network Applications	22	33	30	41	56	78	104	141	37

EXHIBIT C-12

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Austria**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	58	10	63	70	78	87	97	105	11
- Electronic Information Services	50	7	53	58	62	66	70	71	6
- Network Applications	8	31	10	13	17	21	28	34	28

EXHIBIT C-13

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Spain**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	144	12	161	186	214	251	289	325	15
- Electronic Information Services	109	10	120	134	150	170	189	205	11
- Network Applications	35	21	42	52	65	81	100	120	24

EXHIBIT C-14

Network Services Market Forecast in U.S. \$ by Market Segment, 1992-1997 Portugal

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	6	31	8	10	13	18	25	33	33
- Electronic Information Services	5	23	6	7	9	12	15	19	28
- Network Applications	2	40	2	3	4	6	10	14	46

EXHIBIT C-15

Network Services Market Forecast in U.S. \$ by Market Segment, 1992-1997 Greece

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	13	17	16	19	23	28	35	41	21
- Electronic Information Services	10	11	11	13	14	17	19	21	14
- Network Applications	4	31	5	6	9	12	16	20	34

EXHIBIT C-16

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Ireland**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	16	22	19	23	26	32	39	46	19
- Electronic Information Services	11	8	11	13	15	17	18	20	12
- Network Applications	5	33	7	9	11	15	19	25	29

EXHIBIT C-17

**Network Services Market Forecast in U.S. \$
by Market Segment, 1992-1997
Eastern Europe**

	U.S. \$ Millions								
Delivery Modes	1991	1991-1992 AGR (Percent)	1992	1993	1994	1995	1996	1997	1992-1997 CAGR (Percent)
Network Services	2	0	2	4	6	8	12	17	53
- Electronic Information Services	1	0	1	1	2	2	3	4	48
- Network Applications	1	50	2	3	4	6	9	14	55

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D

Forecast Reconciliation, 1991-1992

Exhibit D-1 shows the changes made in this year's forecast in comparison to that of the previous year.

The main difference between estimates in 1991 and 1992 is in the forecasts and market size of the network applications market sector. This is a result of the extraction of network management from the network applications category. The network management figures, in 1992, have been incorporated within the INPUT Systems Operations Programme. As a result, the market for network applications appears to have fallen quite substantially in terms of value.

Additionally, the fluctuations in exchange rates against the U.S. dollar in 1992 have, in general, created an apparent increase of 6% in market values throughout the software and services market-place. This has affected both the figures for network applications and electronic information services.

In terms of market growth, the 1992 research indicates marginally lower growth for both the network applications sector and the electronic information services sector than forecast last year.

EXHIBIT D-1

Network Services Reconciliation of Market Forecast Europe

	1991 Market			1996 Market			1991- 1996 CAGR Forecast in 1991	1992- 1997 CAGR Forecast in 1992
	1991 Report (\$ M)	1992 Report (\$ M)	Variance (%)	1991 Report (\$ M)	1992 Report (\$ M)	Variance (%)	(%)	(%)
Network Applications	1,390	1,110	-20	5,340	3,960	-26	31	29
Electronic Information Services	3,320	3,300	-1	6,250	5,250	-16	13	10
Total (Rounded)	4,720	4,400	-7	11,590	9,250	-20	20	17

E

Definition of Terms

A

Introduction

INPUT's *Definition of Terms* provides the framework for all of INPUT's market analyses and forecasts of the information services industry. It is used for all U.S. programmes. The structure defined in Exhibit E-1 is also used in Europe and for the worldwide forecast.

One of the strengths of INPUT's market analysis services is the consistency of the underlying market sizing and forecast data. Each year INPUT reviews its industry structure and makes changes if they are required. When changes are made they are carefully documented and the new definitions and forecasts reconciled to the prior definitions and forecasts. INPUT clients have the benefit of being able to track market forecast data from year to year against a proven and consistent foundation of definitions.

For 1992 INPUT has added one delivery mode and defined three new submodes to its Information Services Industry Structure:

- *Equipment Services* has been added as the ninth delivery mode. INPUT has forecasted the equipment maintenance, support and related services market through its Customer Services Programmes for a number of years. Starting in 1992, the equipment services portion of the customer services market will be included in the total information services industry as defined by INPUT. Other portions of this market (such as software support) are already included.
- Two new submodes have been defined in the *Systems Operations* delivery mode - *desktop services* and *network management*. They are defined on pages 5 and 6.
- A fourth submode has been defined within the Professional Services delivery mode—*applications management*. This change reflects a shift in the way some software development and maintenance services are purchased. A complete definition is provided on page 6.

A series of definitions for computer equipment have also been added.

Changes from the 1991 INPUT *Definitions of Terms* are indicated with a ☆.

B

Overall Definitions and Analytical Framework

1. Information Services

Information Services are computer/telecommunications-related products and services that are orientated toward the development or use of information systems. Information services typically involve one or more of the following:

- Use of vendor-provided computer processing services to develop or run applications or provide services such as disaster recovery or data entry (called *Processing Services*)
- A combination of computer equipment, packaged software and associated support services which will meet an application systems need (called *Turnkey Systems*)
- Packaged software products, including systems software or applications software products (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)
- The combination of products (software and equipment) and services where the vendor assumes total responsibility for the development of a custom integrated solution to an information systems need (called *Systems Integration*)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services that support the delivery of information in electronic form—typically network-orientated services such as value-added networks, electronic mail and document interchange (called *Network Applications*)
- Services that support the access and use of public and proprietary information such as on-line data bases and news services (called *Electronic Information Services*)
- Services that support the operation of computer and digital communication equipment (called *Equipment Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., electronic data interchange services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the information services industry consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels; and competitive issues.

2. Market Forecasts/User Expenditures

All information services market forecasts are estimates of *User Expenditures* for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)
- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers

Captive Information Services User Expenditures are expenditures for products and services provided by a vendor that is part of the same parent corporation as the user. These expenditures are not included in INPUT forecasts.

Non-captive Information Services User Expenditures are expenditures that go to vendors that have a different parent corporation than the user. It is these expenditures which constitute the information services market analyzed by INPUT and that are included in INPUT forecasts.

3. Delivery Modes

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the nine delivery modes defined by INPUT, six are considered primary products or services:

- *Processing Services*
- *Network Services*
- *Professional Services*
- *Applications Software Products*
- *Systems Software Products*
- *Equipment Services*

The remaining three delivery modes represent combinations of these products and services, combined with equipment, management and/or other services:

- *Turnkey Systems*
- *Systems Operations*
- *Systems Integration*

Section C describes the delivery modes and their structure in more detail.

4. Market Sectors

Market Sectors or markets are groupings or categories of the buyers of information services. There are three types of user markets:

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc. These are called “industry-specific” markets.
- *Functional Application* markets, such as Human Resources, Accounting, etc. These are called “cross-industry” markets.
- *Other* markets, which are neither industry- nor application-specific, such as the market for systems software products and much of the on-line data base market.

Specific market sectors used by INPUT are defined in Section E, below.

5. Trading Communities

Information technology is playing a major role in re-engineering, not just companies but the value chain or *Trading Communities* in which these companies operate. This re-engineering is resulting in electronic commerce emerging where interorganisational electronic systems facilitate the business processes of the trading community.

- A trading community is the group or organisations—commercial and non-commercial—involved in producing a good or services.
- Electronic commerce and trading communities are addressed in INPUT's EDI and Electronic Commerce Programme.

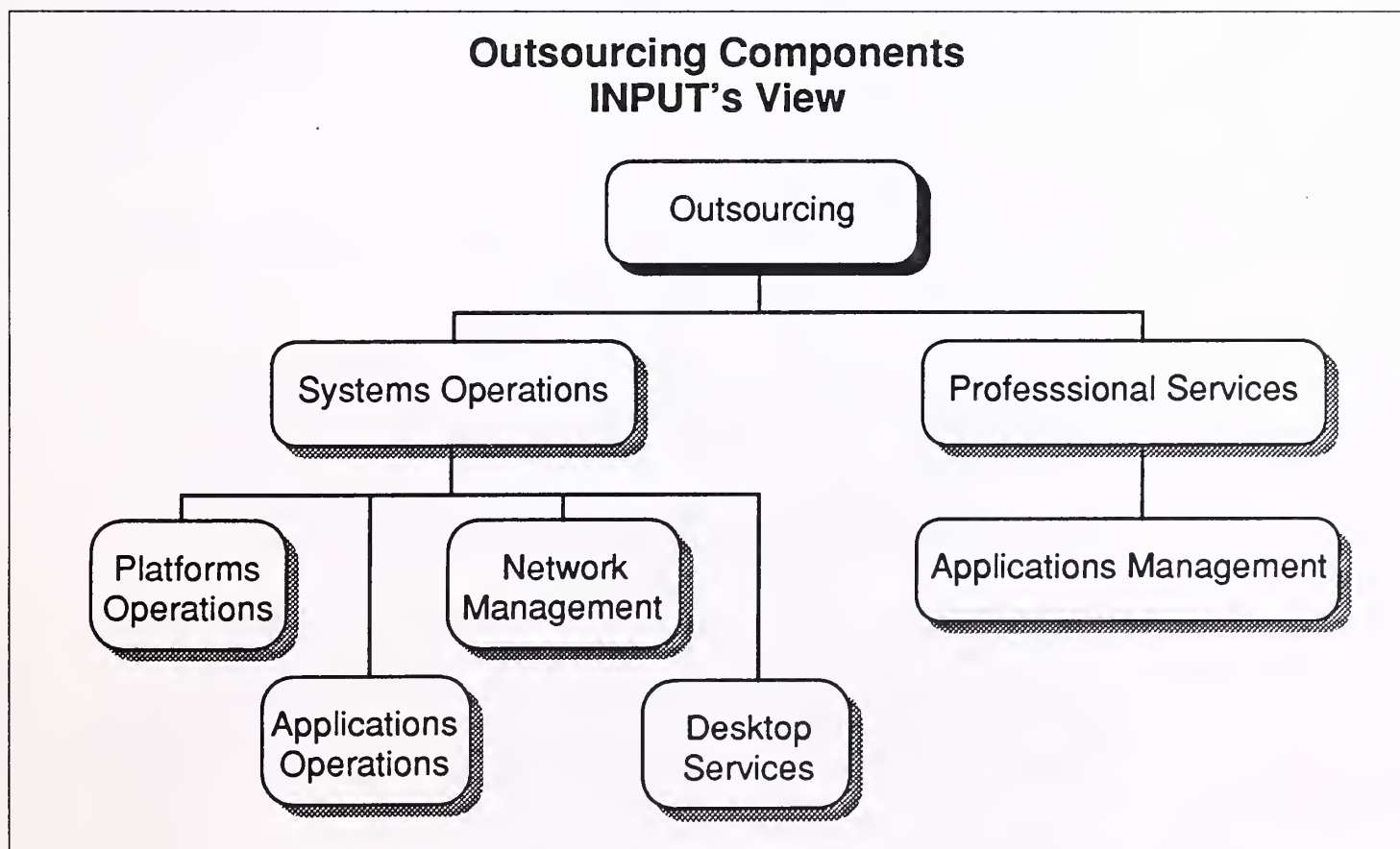
6. Outsourcing

Over the past few years a major change has occurred in the way clients are buying some information services. The shift has been labeled *outsourcing*.

INPUT views outsourcing as a change in the form of the client/vendor relationship. Under an outsourcing relationship, all or a major portion of the information systems function is contracted to a vendor in a long-term relationship. The vendor is responsible for the performance of the function.

INPUT considers the following submodes to be outsourcing-type relationships and in aggregate to represent the outsourcing market. See Exhibit E-1. Complete definitions are provided in Section C of this document. INPUT provides these forecasts as part of the corresponding delivery modes.

EXHIBIT E-1



- *Platform Systems Operations* - The vendor is responsible for managing and operating the client's computer systems.
- *Applications System Operations* - The vendor is responsible for developing and/or maintaining a client's applications as well as operating the computer systems.
- ☆ *Network Management* - The vendor assumes full responsibility for operating and managing the client's data communications systems. This may also include the voice communications of the client.
- ☆ *Applications Management/Maintenance* - The professional services vendor has full responsibility for developing and/or maintaining some or all of the applications systems that a client uses to support business operations. The services are provided on a long-term contractual basis.
- ☆ *Desktop Services* - The vendor assumes responsibility for the deployment, maintenance, and connectivity between the personal computers and/or intelligent workstations in the client organisation. The services may also include performing the help-desk function. The services are provided on a long-term contractual basis.

C

Delivery Modes and Submodes

Exhibit E-2 provides the overall structure of the information services industry as defined and used by INPUT. This section of *Definition of Terms* provides definitions for each of the delivery modes and their submodes or components.

1. Software Products

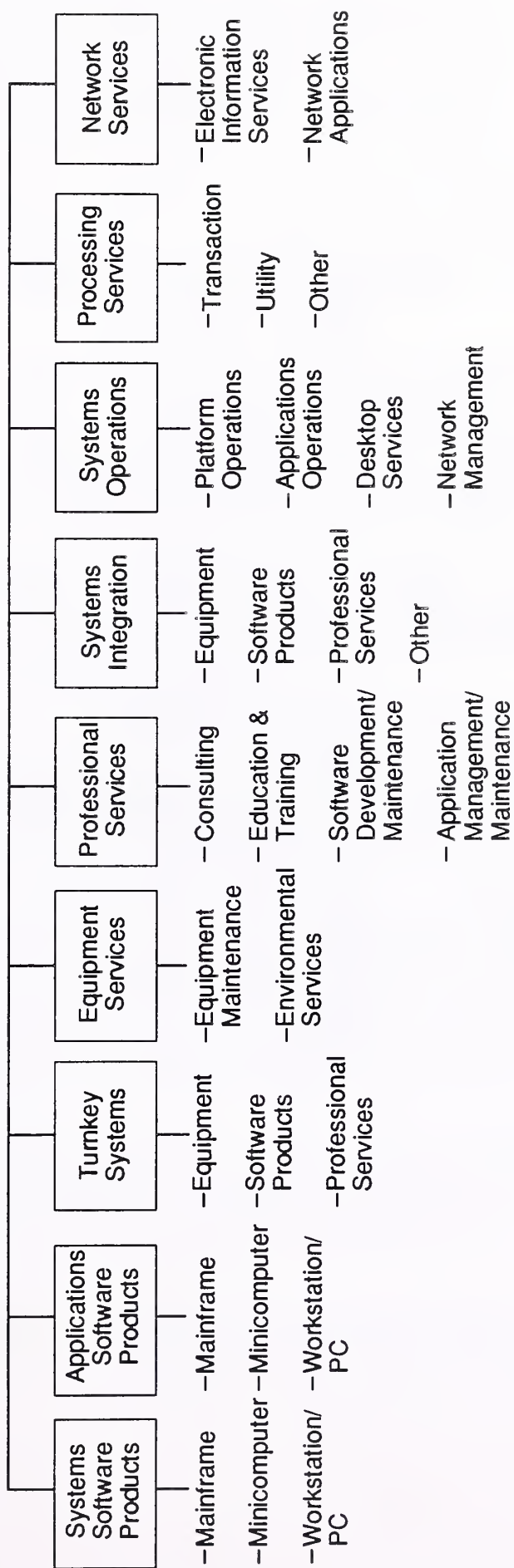
INPUT divides the software products market into two delivery modes: systems software and applications software.

The two delivery modes have many similarities. Both involve purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Vendor-provided training or support in operation and use of the package, if part of the software pricing, is also included here.

Expenditures for work performed by organisations other than the package vendor are counted in the professional services delivery mode. Fees for work related to education, consulting, and/or custom modification of software products are also counted as professional services, provided such fees are charged separately from the price of the software product itself.

EXHIBIT E-2

Information Services Industry Structure—1992

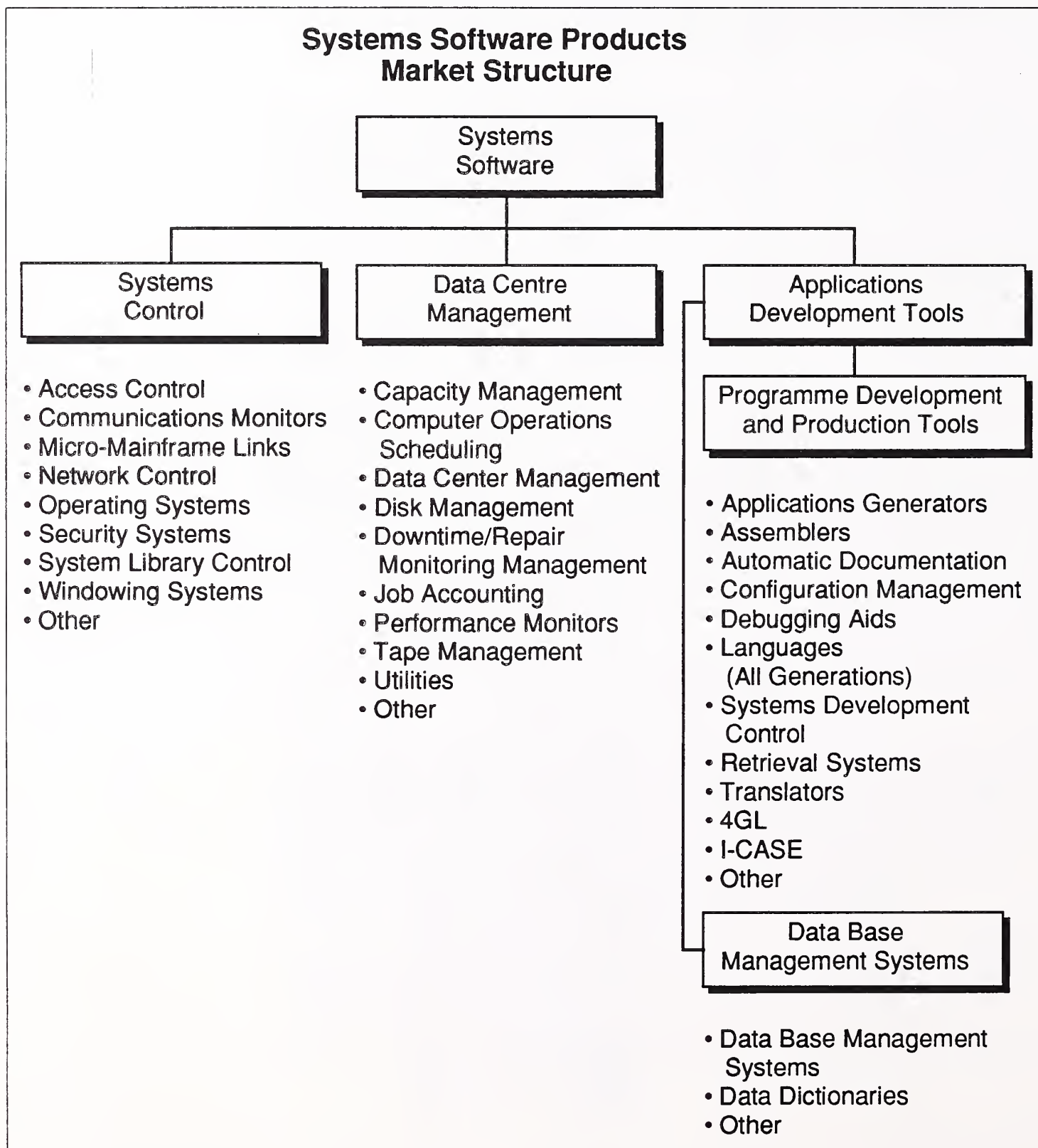


Source: INPUT

a. Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-orientated or user interface functions. INPUT divides systems software products into three submodes. See Exhibit E-3.

EXHIBIT E-3



- *Systems Control Products* - Software programmes that manage computer system resources and control the execution of programmes. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.
- *Operations Management Tools* - Software programmes used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.
- *Applications Development Tools* - Software programmes used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems and other development productivity aids.

INPUT also forecasts the systems software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

b. Applications Software Products

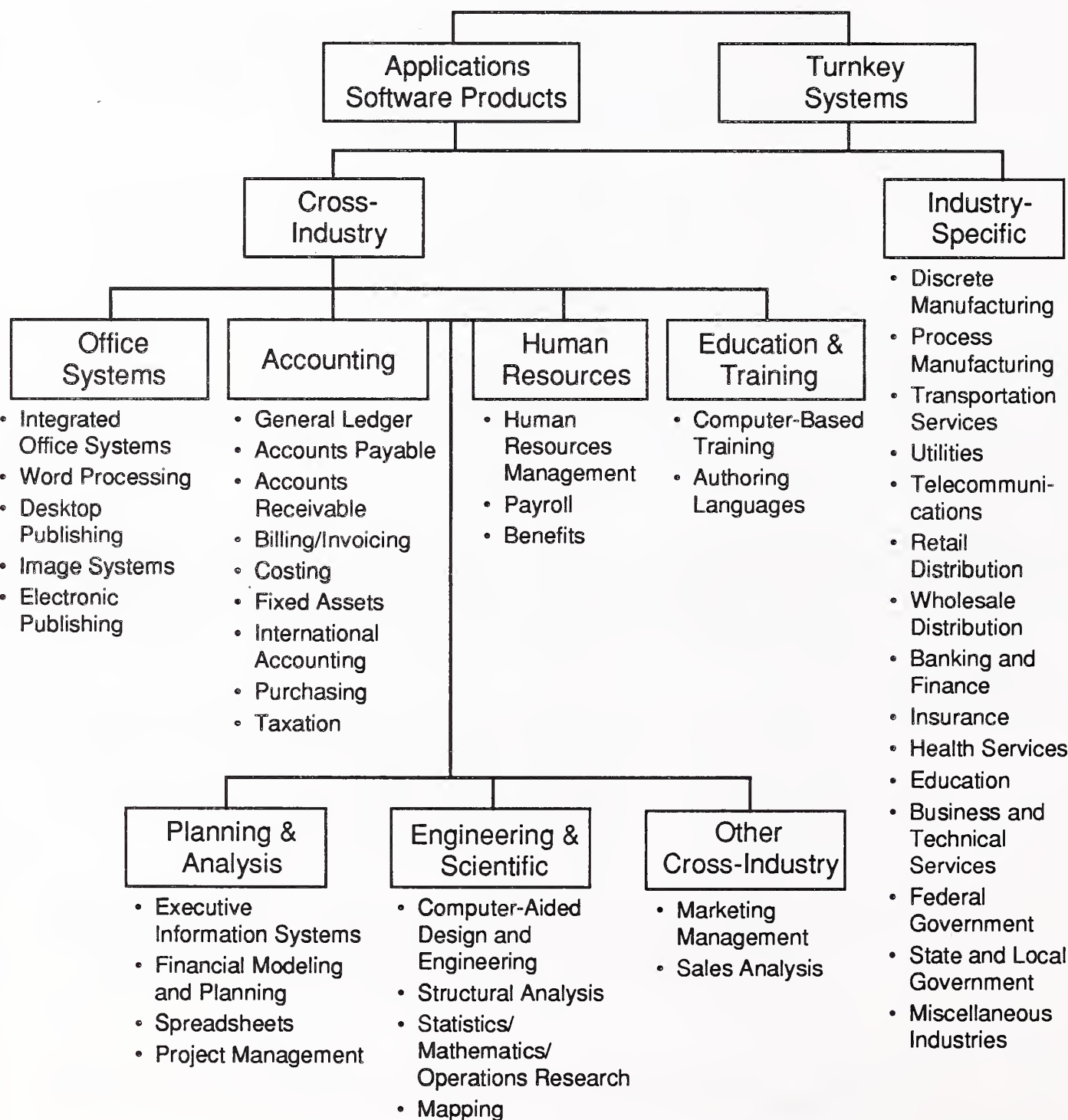
Applications software products enable a user or group of users to support an operational or administrative process within an organisation. Examples include accounts payable, order entry, project management and office systems. INPUT categorizes applications software products into two groups of market sectors. (See Exhibit E-4.)

- *Industry Applications Software Products* - Software products that perform functions related to fulfilling business or organisational needs unique to a specific industry (vertical) market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile dealer parts inventory, etc.
- *Cross-Industry Applications Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Examples include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

INPUT also forecasts the applications software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

EXHIBIT E-4

Application Products and Turnkey Systems



2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged applications software into a single product developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and professional services provided. INPUT categorizes turnkey systems into two groups of market sectors as it does for applications software products. (See Exhibit E-4.)

Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Computer manufacturers (e.g., IBM or DEC) that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

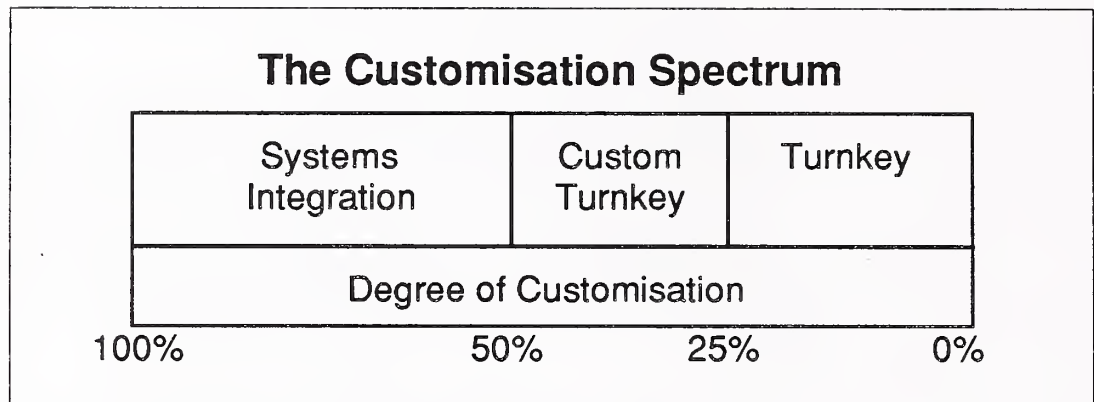
- *Value-Added Reseller (VAR):* A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually applications software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services, software support, and applications upgrades.

Turnkey systems have three components:

- Equipment - computer hardware supplied as part of the turnkey system
- Software products - prepackaged systems and applications software products
- Professional services - services to install or customize the system or train the user, provided as part of the turnkey system sale

Exhibit E-5 contrasts turnkey systems with systems integration. Turnkey systems are based on available software products that a vendor may modify to a modest degree.

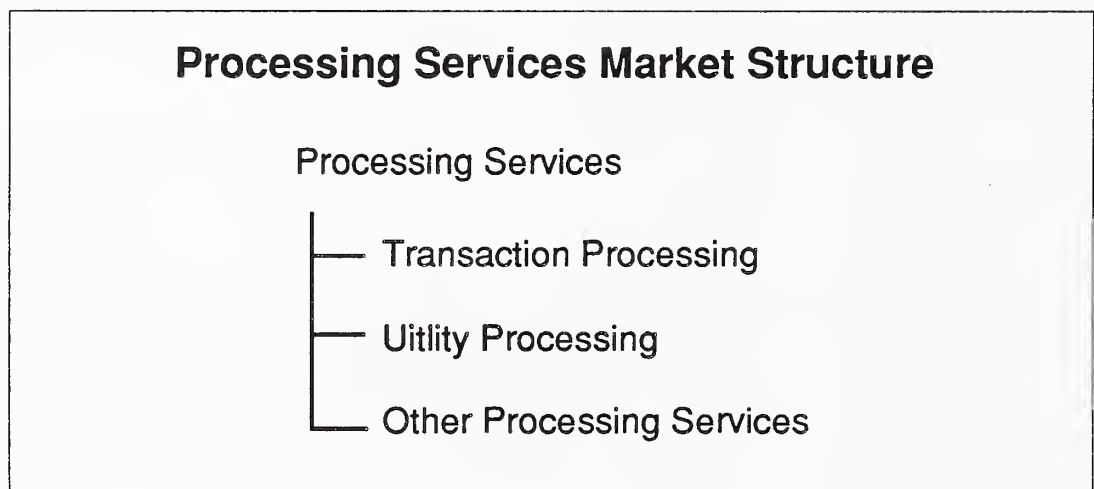
EXHIBIT E-5



3. Processing Services

This delivery mode includes three submodes: transaction processing, utility processing, and "other" processing services. See Exhibit E-6.

EXHIBIT E-6



- *Transaction Processing* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at the vendor site or customer site to process specific applications and update client data bases. The application software is typically provided by the vendor.
- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), enabling clients to develop and/or operate their own programmes or process data on the vendor's system.
- *Other Processing Services* - Vendor provides service—usually at the vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

4. Systems Operations

Systems operations as a delivery mode was introduced in the 1990 Market Analysis and Systems Operations programmes. Previously called Facilities Management, this delivery mode was created by taking the Systems Operations submode out of both Processing Services and Professional Services. For 1992 the submodes have been defined as follows.

Systems operations involves the operation and management of all or a significant part of the client's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes where the difference is whether the support of applications, as well as data centre operations, is included.

- *Platform systems operations* - The vendor manages and operates the computer systems, to perform the client's business functions, without taking responsibility for the client's application systems.
- *Applications systems operations* - The vendor manages and operates the computer systems to perform the client's business functions, and is also responsible for maintaining, or developing and maintaining, the client's application systems.
- ☆ *Network Management* - The vendor assumes responsibility for operating and managing the client's data communications systems. This may also include the voice communications of the client. A network management outsourcing contract may include only the management services or the full costs of the communications services and equipment plus the management services.
- ☆ *Desktop Services* - The vendor assumes responsibility for the deployment, maintenance, and connectivity among the personal computers and/or workstations in the client organisation. The services may also include performing the help-desk function. Equipment as well as services can be part of a desktop services outsourcing contract.

Note: This type of client service can also be provided through traditional professional services where the contractual criteria of outsourcing are not present.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the client's information systems environment (equipment, networks, applications systems), either at the client's site or the vendor's site.

Note: In the U.S. federal government market, systems operation services are also defined by equipment ownership with the terms "COCO" (Contractor-Owned, Contractor-Operated), and "GOCO" (Government-Owned, Contractor-Operated).

5. Systems Integration (SI)

Systems integration is a vendor service that provides a complete solution to an information system, networking or automation development requirement through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price. (Refer to Exhibit E-7.)

The components of a systems integration project are the following:

- *Equipment* - information processing and communications equipment required to build the systems solution. This component may include custom as well as off-the-shelf equipment to meet the unique needs of the project. The systems integration equipment category excludes turnkey systems by definition.
- *Software products* - prepackaged applications and systems software products.
- *Professional services* - the value-added component that adapts the equipment and develops, assembles, or modifies the software and hardware to meet the system's requirements. It includes all of the professional services activities required to develop, implement, and if included in the contract, operate an information system, including consulting, programme/project management, design and integration, software development, education and training, documentation, and systems operations and maintenance.
- *Other services* - most systems integration contracts include other services and product expenditures that are not classified elsewhere. This category includes miscellaneous items such as engineering services, automation equipment, computer supplies, business support services and supplies, and other items required for a smooth development effort.

EXHIBIT E-7

Products/Services in Systems Integration Projects

Equipment

- Information systems
- Communications

Software Products

- Systems software
- Applications software

Professional Services

- Consulting
 - Feasibility and trade-off studies
 - Selection of equipment, network and software
- Programme/project management
- Design/integration
 - Systems design
 - Installation of equipment, network, and software
 - Demonstration and testing
- Software development
 - Modification of software packages
 - Modification of existing software
 - Custom development of software
- Education/training and documentation
- Systems operations/maintenance

Other Miscellaneous Products/Services

- Site preparation
- Data processing supplies
- Processing/network services
- Data/voice communication services

6. Professional Services

This category includes four submodes: consulting, education and training, software development, and applications management. Exhibit E-8 provides additional detail.

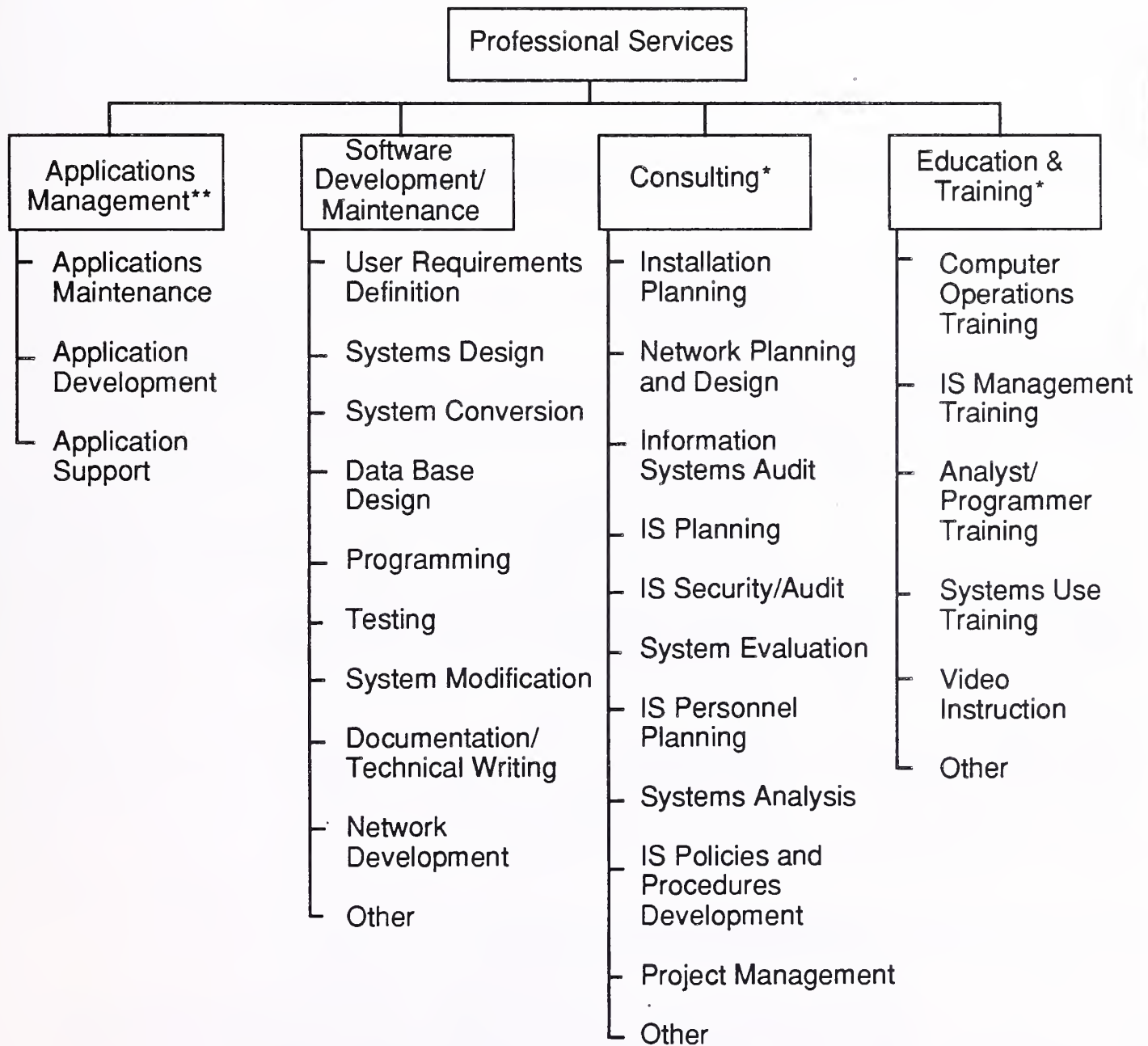
- *Consulting*: Services include management consulting (related to information systems), information systems re-engineering, information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of the information system, including equipment, software, networks and systems operations.
- *Education and Training*: Services that provide training and education or the development of training materials related to information systems and services for the information systems professional and the user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation. Education and training provided by school systems are not included. General education and training products are included as a cross-industry market sector.
- *Software Development*: Services include user requirements definition, systems design, contract programming, documentation, and implementation of software performed on a custom basis. Conversion and maintenance services are also included.
- ☆ *Applications Management*: The vendor has full responsibility for maintaining and upgrading some or all of the application systems that a client uses to support business operations and may develop and implement new application systems for the client.

An applications management contract differs from traditional software development in the form of the client/vendor relationship. Under traditional software development services the relationship is project based. Under applications management it is time and function based.

These services may be provided in combination or separately from platform systems operations.

EXHIBIT E-8

Professional Services Market Structure



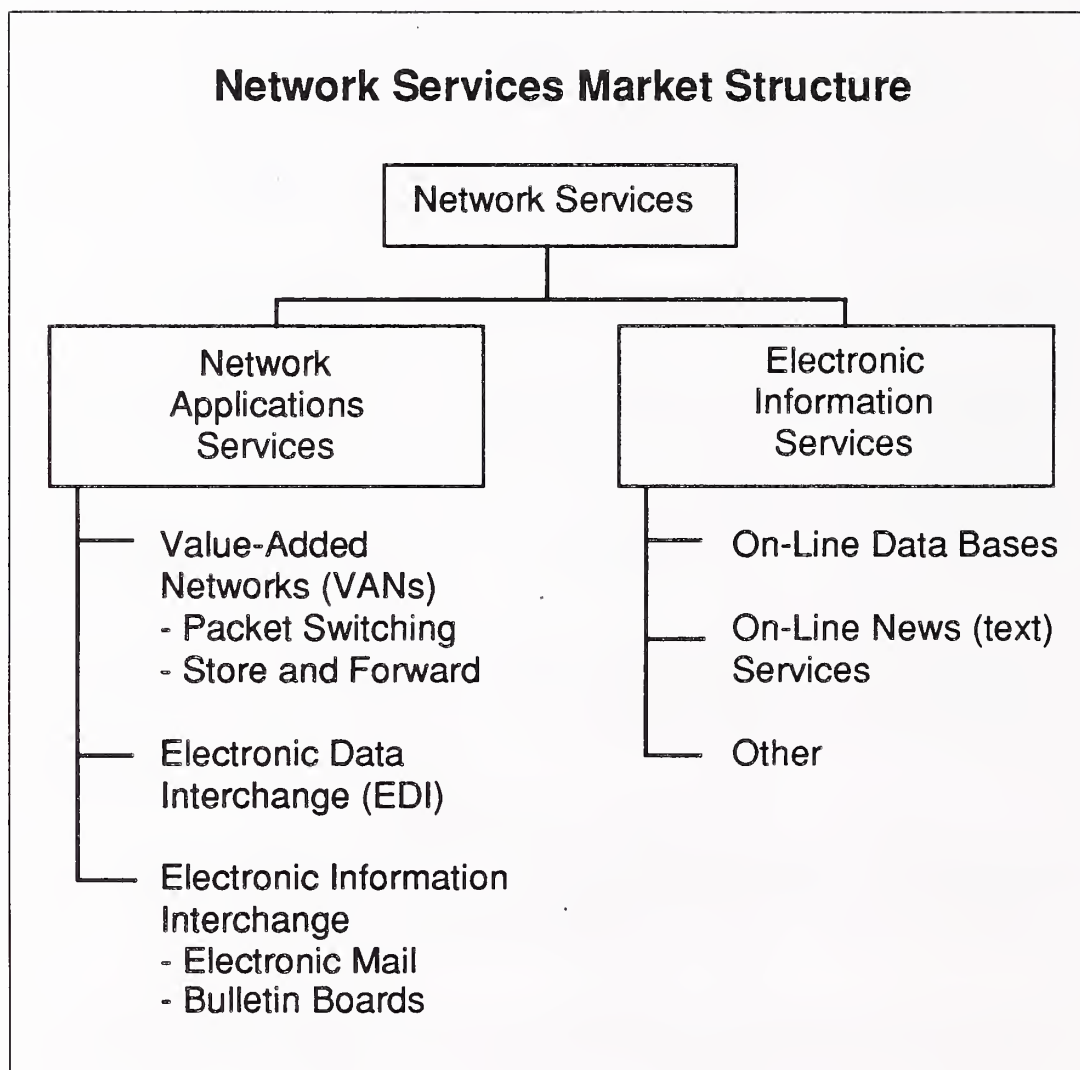
*Related to computer systems, topics, or issues

**Vendor assumes full responsibility on contracted longer term basis

7. Network Services

Network services are a variety of telecommunications-based functions and operations. Network service includes two submodes, as shown in Exhibit E-9.

EXHIBIT E-9



a. Electronic Information Services

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers.

Users inquire into and extract information from the data bases. They may load extracted data into their own computer systems; the vendor does not provide data processing or manipulation capability as part of the electronic information service and users cannot update the vendor's data bases. However, the vendor may offer other services (network applications or processing services) that do offer processing or manipulation capability.

The two kinds of electronic information services are:

- *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.
- Unstructured, primarily textual information on people, companies, events, etc. These are often news services.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

b. Network Applications

Value-Added Network Services (VAN Services) - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

Electronic Data Interchange (EDI) - Application-to-application electronic exchange of business data between trade partners or facilitators using a telecommunications network.

Electronic Information Interchange - The transmission of messages across an electronic network managed by a services vendor, including electronic mail, voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.

8. Equipment Services

- ☆ The equipment services delivery mode includes two submodes. Both deal with the support and maintenance of computer equipment.
- ☆ *Equipment Maintenance* - Services provided to repair, diagnose problems and provide preventive maintenance both on-site and off-site for computer equipment. The costs of parts, media and other supplies are excluded. These services are typically provided on a contract basis.
- ☆ *Environmental Services* - Composed of equipment and data centre related special services such as cabling, air conditioning and power supply, equipment relocation and similar services.

D

Computer Equipment

- ☆ These definitions have been included to provide the basis for market segmentation in the software products markets.
- ☆ *Computer Equipment* - Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system. Unless otherwise noted in an INPUT forecast, computer equipment is only included where it is part of the purchase of services or software products (e.g., turnkey systems and systems integration).
- ☆ *Peripherals* - Includes all input, output, communications, and storage devices (other than main memory) that can be channel connected to a processor, and generally cannot be included in other categories such as terminals.
- ☆ *Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.
- ☆ *Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters
- ☆ *Communication Devices* - Includes modem, encryption equipment, special interfaces, and error control
- ☆ *Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories

- ☆ *Computer Systems* - Includes all processors from personal computers to supercomputers. Computer systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices and processors or CPUs not provided as part of an integrated (turnkey) system.
- ☆ *Personal computers* - Smaller computers using 8-, 16-, or 32-bit computer technology. Generally designed to sit on a desktop and are portable for individual use. Price generally less than \$5,000.
- ☆ *Workstations* - High-performance, desktop, single-user computers often employing Reduced Instruction Set Computing (RISC). Workstations provide integrated, high-speed, local network-based services such as data base access, file storage and back-up, remote communications, and peripheral support. These products usually cost from \$5,000 to \$15,000.
- ☆ *Minicomputer or midsize computers* - Minicomputers are generally priced from \$15,000 to \$350,000. Many of the emerging client/server computers are in this category.
- ☆ *Mainframe or large computers* - Traditional mainframe and supercomputers costing more than \$350,000.

E

Sector Definitions

1. Industry Sector Definitions

INPUT structures the information services market into industry sectors such as process manufacturing, insurance, transportation, etc. The definitions of these sectors are based on the 1987 revision of the Standard Industrial Classification (SIC) code system. The specific industries (and their SIC codes) included under these industry sectors are detailed in Exhibit E-10.

INPUT includes all delivery modes except systems software products and equipment services in industry market sectors. See Exhibit E-9 and section E-3 (Delivery Mode Reporting by Sector).

Note: SIC code 88 is Personal Households. INPUT does not currently analyze or forecast information services in this market sector.

EXHIBIT E-10

Industry Sector Definitions

Industry Sector	SIC Code	Description
Discrete Manufacturing	23xx	Apparel and other finished products
	25xx	Furniture and fixtures
	27xx	Printing, publishing and allied industries
	31xx	Leather and leather products
	34xx	Fabricated metal products, except machinery and transportation equipment
	35xx	Industrial and commercial machinery and computer equipment
	36xx	Electronic and other electrical equipment and components, except computer equipment
	37xx	Transportation equipment
	38xx	Instruments; photo/med/optical goods; watches/clocks
	39xx	Miscellaneous manufacturing industry
Process Manufacturing	10xx	Metal mining
	12xx	Coal mining
	13xx	Oil and gas extraction
	14xx	Mining/quarrying nonmetallic minerals
	20xx	Food and kindred products
	21xx	Tobacco products
	22xx	Textile mill products
	24xx	Lumber and wood products, except furniture
	26xx	Paper and allied products
	28xx	Chemicals and allied products
	29xx	Petroleum refining and related industries
	30xx	Rubber and miscellaneous plastic products
	32xx	Stone, clay, glass and concrete products
	33xx	Primary metal industries
Transportation Services	40xx	Railroad transport
	41xx	Public transit/transport
	42xx	Motor freight transport/warehousing
	43xx	U.S. Postal Service
	44xx	Water transportation
	45xx	Air transportation (including airline reservation services in 4512)
	46xx	Pipelines, except natural gas
	47xx	Transportation services (including 472x, arrangement of passenger transportation)

EXHIBIT E-10 (CONT.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Telecommunications	48xx	Communications
Utilities	49xx	Electric, gas and sanitary services
Retail Distribution	52xx 53xx 54xx 55xx 56xx 57xx 58xx 59xx	Building materials General merchandise stores Food stores Automotive dealers, gas stations Apparel and accessory stores Home furniture, furnishings and accessory stores Eating and drinking places Miscellaneous retail
Wholesale Distribution	50xx 51xx	Wholesale trade - durable goods Wholesale trade - nondurable goods
Banking and Finance	60xx 61xx 62xx 67xx	Depository institutions Nondepository institutions Security and commodity brokers, dealers, exchanges and services Holding and other investment offices
Insurance	63xx 64xx	Insurance carriers Insurance agents, brokers and services
Health Services	80xx	Health services
Education	82xx	Educational services

EXHIBIT E-10 (CONT.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Business Services	65xx	Real estate
	70xx	Hotels, rooming houses, camps, and other lodging places
	72xx	Personal services
	73xx	Business services (except hotel reservation services in 7389)
	7389x	Hotel reservation services
	75xx	Automotive repair, services and parking
	76xx	Miscellaneous repair services
	78xx	Motion pictures
	79xx	Amusement and recreation services
	81xx	Legal services
	83xx	Social services
	84xx	Museums, art galleries, and botanical/zoological gardens
	86xx	Membership organisations
	87xx	Engineering, accounting, research, management, and related services
	89xx	Miscellaneous services
Federal Government	9xxx	
State and Local Government	9xxx	
Miscellaneous Industries	01xx	Agricultural production - crops
	02xx	Agricultural production - livestock/animals
	07xx	Agricultural services
	08xx	Forestry
	09xx	Fishing, hunting and trapping
	15xx	Building construction - general contractors, operative builders
	16xx	Heavy construction - contractors
	17xx	Construction - special trade contractors

2. Cross-Industry Sector Definitions

INPUT has identified seven cross-industry market sectors. These sectors or markets involve multi-industry applications such as human resource systems, accounting systems, etc.

- In order to be included in an industry sector, the service or product delivered must be specific to that sector only. If a service or product is used in more than one industry sector, it is counted as cross-industry.
- INPUT only includes the turnkey systems, applications software products, and transaction processing services in the cross-industry sectors.

The seven cross-industry markets are:

Accounting - consists of applications software products and information services that serve such functions as:

- General ledger
 - Financial management
 - Accounts payable
 - Accounts receivable
 - Billing/invoicing
 - Fixed assets
 - International accounting
 - Purchasing
 - Taxation
 - Financial consolidation
- Excluded are accounting products and services directed to a specific industry, such as tax processing services for CPAs and accountants within the business services industry sector.

Human Resources - consists of application solutions purchased by multiple industry sectors to serve the functions of human resources management and payroll. Examples of specific applications within these two major functions are:

- Employee relations
- Benefits administration
- Government compliance
- Manpower planning
- Compensation administration
- Applicant tracking
- Position control
- Payroll processing

Education and Training - consists of education and training for information systems professionals and users of information systems delivered as a software product, turnkey system or through processing services. The market for computer-based training tools for the training of any employee on any subject is also included.

Office Systems consists of the following:

- Integrated office systems (IOS)
 - Word processing
 - Desktop publishing
 - Electronic publishing
 - Image systems
- IOSs—such as IBM's OfficeVision, HP's NewWave Office and DEC's All-In-1—typically include the following core functions, all of which are accessed from the same desktop: electronic mail, decision support systems, time management and filing systems.
 - Office systems graphics include presentation graphics (which represent the bulk of office systems graphics), paint and line art, page description languages, and electronic form programmes.
 - The fundamental difference between electronic publishing and desktop publishing (within the office systems sector) is that electronic publishing encompasses a method of document management and control from a single point—regardless of how many authors/locations work on a document—whereas desktop publishing is a personal productivity tool and is generally a lower end product residing on a personal computer.
 - Electronic or computer publishing systems that are sold strictly and specifically to commercial publishers, printers, and typesetters are excluded from cross-industry consideration and are included in the discrete manufacturing industry.

Engineering and Scientific encompasses the following applications:

- Computer-aided design and engineering (CAD and CAE)
 - Structural analysis
 - Statistics/mathematics/operations research
 - Mapping/GIS
- Computer-aided manufacturing (CAM) or CAD that is integrated with CAM is excluded from the cross-industry sector as it is specific to the manufacturing industries. CAD or CAE that is dedicated to integrated circuit design is also excluded because it is specific to the semiconductor industry.

Planning and Analysis consists of software products and information services in four application areas:

- Executive Information Systems (EIS)
- Financial modeling or planning systems
- Spreadsheets
- Project management

Other encompasses marketing/sales and electronic publishing application solutions.

- Sales and marketing includes:

- Sales analysis
- Marketing management
- Demographic market planning models

3. Delivery Mode Reporting by Sector

This section describes how the delivery mode forecasts relate to the market sector forecasts. Exhibit E-11 summarizes the relationships.

- *Processing services* - The transaction processing services submode is forecasted for each industry and cross-industry market sector. The utility and other processing services submodes are forecasted in total market in the general market sector.
- *Turnkey systems* - Turnkey systems is forecasted for the 15 industry and 7 cross-industry sectors. Each component of turnkey systems is forecasted in each sector.
- *Applications software products* - The applications software products delivery mode is forecasted for the 15 industry and 7 cross-industry sectors. In addition, each forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.
- *Systems operations* - Each of the systems operations submodes is forecasted for each of the 15 industry sectors.
- *Systems integration* - Systems integration and each of the components of systems integration are forecasted for each of the 15 industry sectors.
- *Professional services* - Professional services and each of the submodes is forecasted for each of the 15 industry sectors.

EXHIBIT E-11

Delivery Mode versus Market Sector Forecast Content

Delivery Mode	Submode	Market Sectors		
		Industry Sectors	Cross-Industry Sectors	General
Processing Services	Transaction Utility Other	X	X	X X
Turnkey Systems		X	X	
Applications Software Products		X	X	
Systems Operations	Platform Applications	X X		
Systems Integration		X		
Professional Services		X		
Network Services	Network Applications Electronic Information Services	X X		X
Systems Software Products				X
Equipment Services				X

- *Network services* - The network applications submode of network services forecasted for each of the 15 industry sectors.

Industry and cross-industry electronic information services are forecast in relevant market sectors. The remainder of electronic information services is forecasted in total for the general market sector.

- *Systems software products* - Systems software products and its submodes are forecasted in total for the general market sector. Each submode forecast is broken down by platform level: mainframe, mini-computer and workstation/PC.

- *Equipment services* - Equipment services and its submodes are forecasted in total in the general market sectors.

F

Vendor Revenue and User Expenditure Conversion

The size of the information services market may be viewed from two perspectives: vendor (producer) revenues and user expenditures. INPUT defines and forecasts the information services market in terms of user expenditures. User expenditures reflect the markup in producer sales when a product such as software is delivered through indirect distribution channels (such as original equipment manufacturers (OEMs), retailers and distributors). The focus on user expenditure also eliminates the double counting of revenues that would occur if sales were tabulated for both producer (e.g., Lotus) and distributor (e.g., ComputerLand).

For most delivery modes, vendor revenues and user expenditures are fairly close. However, there are some areas of significant difference. Many microcomputer software products, for example, are marketed through distribution channels. To capture the value added through these distribution channels, adjustment factors are used to convert estimated information services vendor revenues to user expenditures.

For some delivery modes, including software products, systems integration and turnkey systems, there is a significant volume of intra-industry sales. For example, systems integrators purchase software and subcontract the services of other professional services vendors. Turnkey vendors incorporate purchased software into the systems they sell to users.

To account for such intra-industry transactions, INPUT uses conversion ratios to derive the estimate of end-user expenditures.

Exhibit E-12 summarizes the net effect of the various ratios used by INPUT to convert vendor revenues to user expenditure (market size) figures for each delivery mode.

EXHIBIT E-12

Vendor Revenue to User Expenditure Conversion

Delivery Mode	Vendor Revenue Multiplier
Applications Software Products	1.18
Systems Software Products	1.10
Systems Operations	0.95
Systems Integration	0.95
Professional Services	0.99
Network Services	0.99
Processing Services	0.99
Turnkey Systems	0.95
Equipment Services	0.99

F European Exchange Rates

The following table, Exhibit F-1, shows the standard exchange rates used throughout the 1992 programme to consolidate country market data for overall European forecasts and vendor market shares.

EXHIBIT F-1

U.S. Dollar and ECU Exchange Rates, 1992

Country	Currency	U.S. Dollar	ECU
France	FF	5.18	6.96
Germany	DM	1.52	2.04
United Kingdom	£	0.532	0.715
Italy	Lira	1,150	1,544
Sweden	Sek	5.54	7.45
Denmark	DK	5.89	7.93
Norway	NK	5.98	8.03
Finland	FM	4.15	5.51
Netherlands	Dfl	1.71	2.29
Belgium	BF	31.26	41.94
Switzerland	SF	1.35	1.81
Austria	Sch	10.63	14.33
Spain	Ptas	96.2	129.6
Portugal	Esc	134.9	181.0
Greece	Dra	174.0	234.8
Ireland	IR£	0.57	0.765
	\$	1	1.34

Source: *Financial Times*, 30 December 1991

European Inflation Rates

Exhibit F-2 shows the average five-year inflation assumptions for each reported country and the changes from those used in reports produced in the previous year. All INPUT forecasts include the effects of inflation as well as natural market growth rates. For consistency, the same inflation rates are used throughout all the different market sector research and analysis during a calendar year, unless specified otherwise.

EXHIBIT F-2

Inflation Assumptions, 1991 and 1992

Country	Assumption 1991-1996	Assumption 1992-1997	Change
France	3.0	2.7	-0.3
Germany	2.7	3.9	+1.2
United Kingdom	4.8	3.7	-1.1
Italy	4.4	5.2	+0.8
Sweden	6.3	4.0	-2.3
Denmark	2.7	2.4	-0.3
Norway	4.9	3.4	-1.5
Finland	5.0	1.4	-3.6
Netherlands	2.4	3.3	+0.9
Belgium	3.3	3.2	-0.1
Switzerland	3.3	3.5	+0.2
Austria	2.6	3.2	+0.6
Spain	4.7	5.0	+0.3
Portugal	8.0	12.5	+4.5
Greece	12.0	11.0	-1.0
Ireland	3.0	3.0	0.0
European Average	4.0	4.2	+0.2

Source: OECD Forecasts, Q4, 1991

